INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine

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MANY educators recognize that better knowledge of the use of color is making an important contribution to the improvement of production techniques and adding to the health and welfare of workers.

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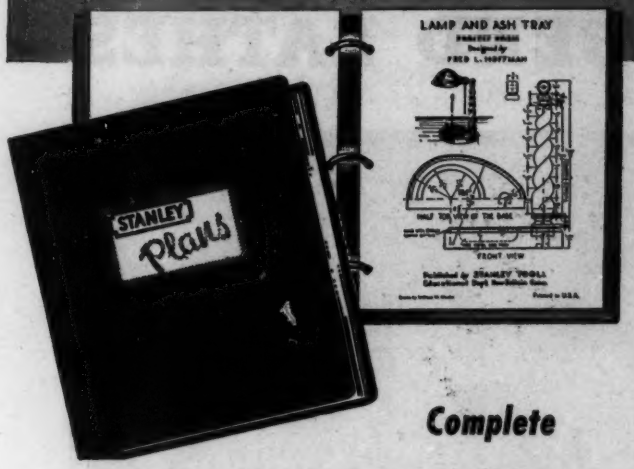

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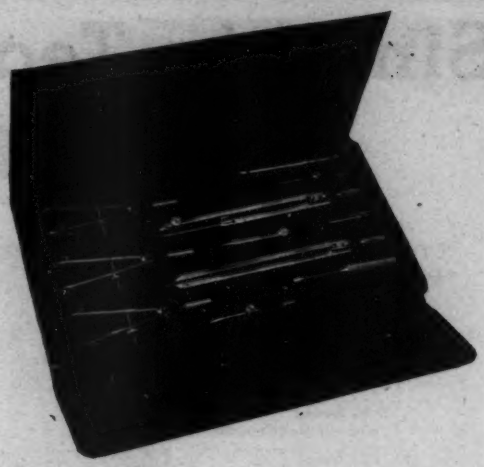

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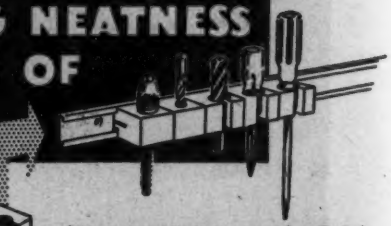

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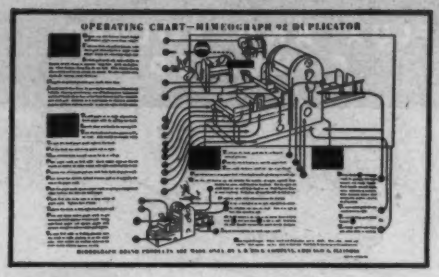

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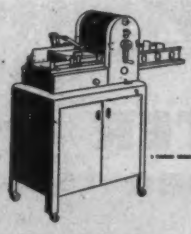

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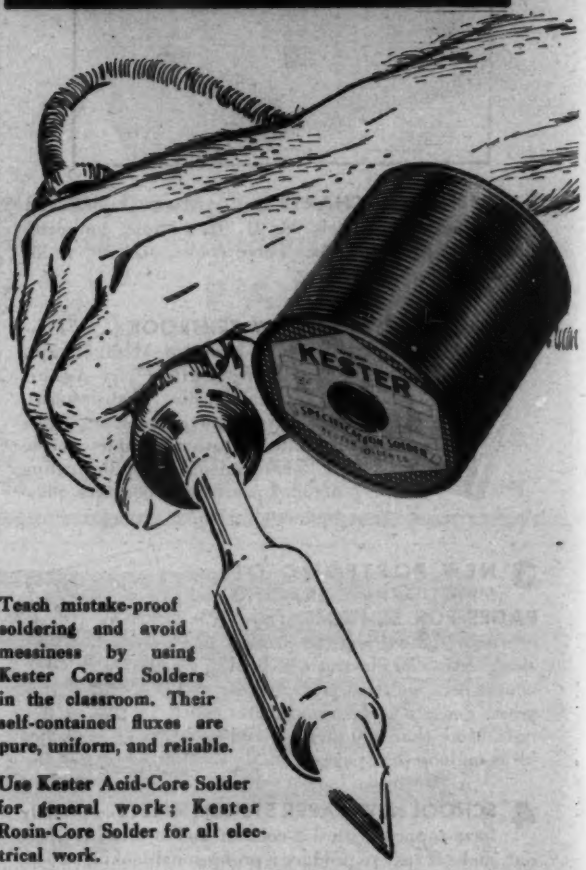

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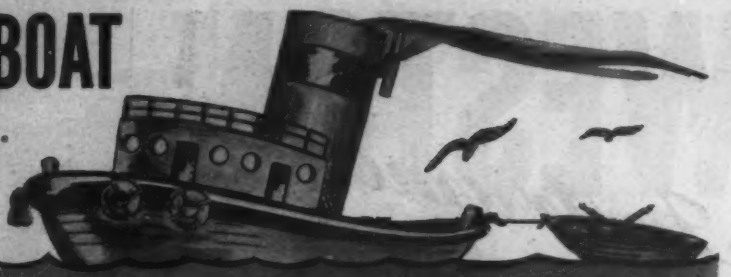

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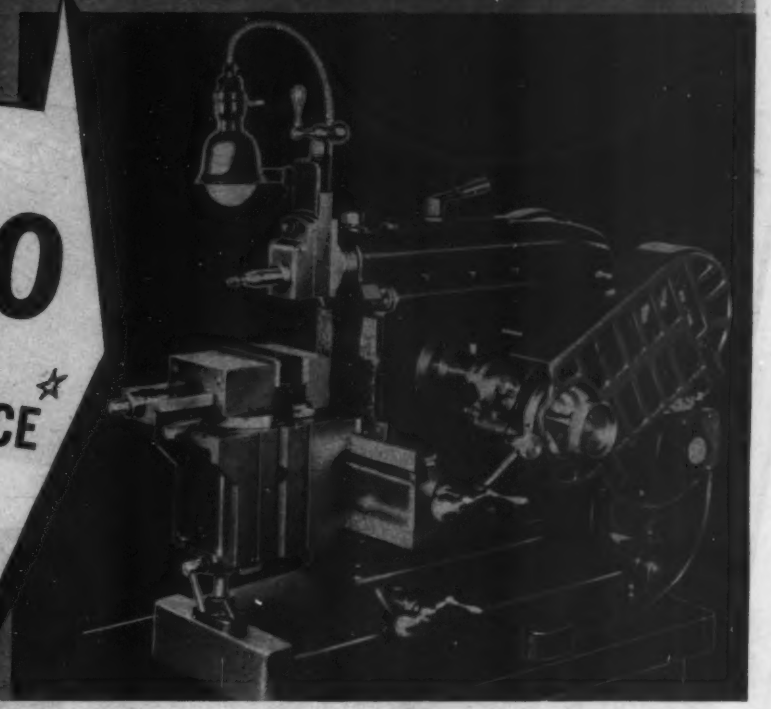

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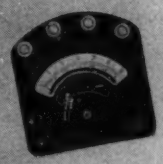

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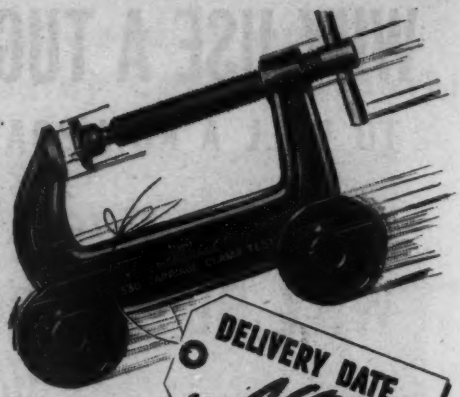

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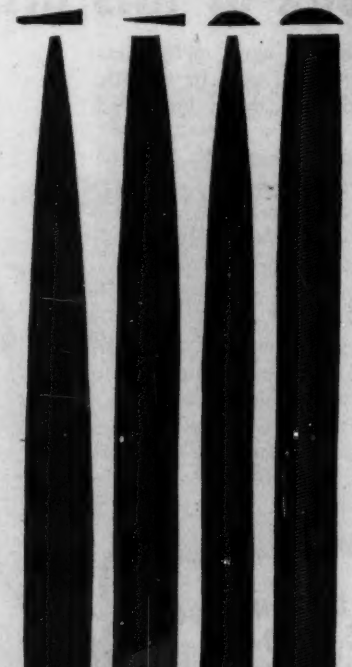

Typical comparisons of Swiss and American Pattern Files—Knife and Half Round shapes

Die making with Swiss Pattern Files

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In This Issue

Vocational teachers will be especially interested in the first three articles in this issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION. The first of these, by C. M. Miller, portrays federal management and supervision that needs correction.

The second article, by Wm. F. Patterson, describes a program which deserves more attention than it is getting at present.

Some of the serial articles, such as those by Bawden, Diamond, and Jones, unfortunately could not be published in the March (*School Shop Annual*) issue, but they are again to be found in this number of the magazine.

There also are a number of projects which, we hope, will be found helpful by the readers of this magazine.

This Month's Cover

The cover for the April issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION shows students working in the industrial-arts laboratory of the Los Alamos Schools, Santa Fe, N. Mex.

The photograph was submitted by Jerome Leavitt, supervisor of industrial arts in the Los Alamos school system.

Coming Conventions

Mar. 29–Apr. 1. National Vocational Guidance Association, at Chicago, Ill. Headquarters, Stevens Hotel. Secretary, Christine Melcher, 82 Beaver St., New York City.

Mar. 29–Apr. 1. New York State Vocational Association, at Buffalo, N. Y. Headquarters, Statler Hotel. Secretary, Dr. Malcolm Galbreath, Morrisville Technical Institute, Morrisville, N. Y.

Apr. 8–10. Southeastern Arts Association, at Columbia, S. C. Headquarters, Columbia Hotel. Secretary, Ruth Harris, 111 W. 11th St., Johnson City, Tenn.

Apr. 8–10. Texas Vocational Teachers Association, at Houston, Tex. Headquarters, Rice Hotel. Secretary, Cecil Brice, Drawer BB, Capital Sta., Houston, Tex.

Apr. 8–10. Michigan Industrial Education Association, at Grand Rapids, Mich. Headquarters, Pantlind Hotel. Secretary, Arthur L. Reagh, 143 Bostwick Ave., N.E., Grand Rapids, Mich.

Apr. 15–17. Indiana Industrial Education Association, at Marshall, Ind. Headquarters, Turkey Run Inn. Secretary, N. G. McComb, 215 State House, Indianapolis 4, Ind.

Apr. 16–17. Pennsylvania Industrial Arts State Conference at Millersville, Pa. Headquarters, State Teachers College. Secretary, Dr. Burl N. Osburn, State Teachers College, Millersville, Pa.

Apr. 24. Connecticut Industrial Arts Association at New Britain, Conn. Headquarters, Teachers College. Secretary, David A. Reed, 536 Thompson Ave., East Haven 12, Conn.

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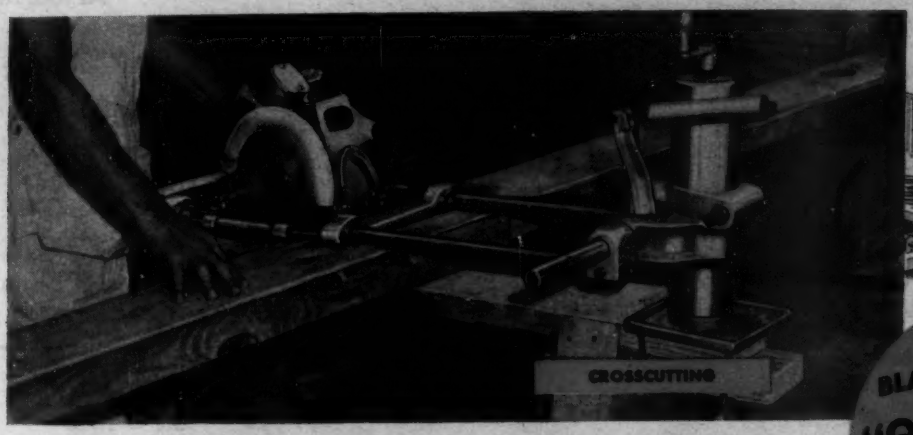

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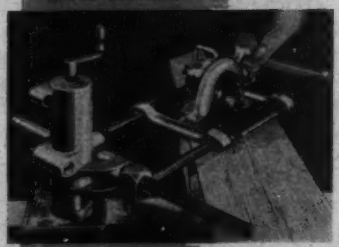
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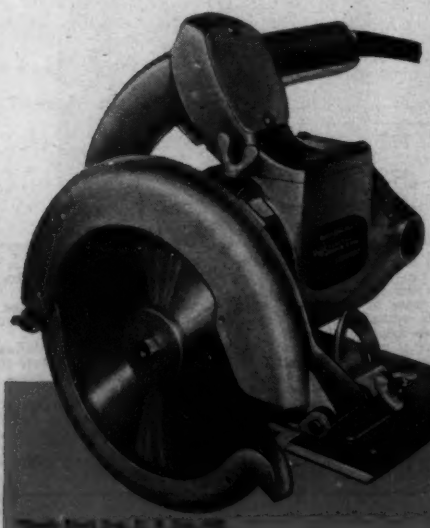

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-JAVE-

APRIL 1948

Yesterday, Today, and Tomorrow in Vocational Education*

C. M. MILLER
Director, Kansas State Board for Vocational Education
Topeka, Kans.

When a surveyor goes forth to survey a field he locates a marker of a previous survey and then surveys *back* just far enough to get his direction for going forward.

I ask the reader, therefore, that he suffer me to pause briefly to assemble and present my credentials, for no one man can speak meaningfully concerning *these* matters except that he erect for himself a sort of sounding board of experience from which he may evaluate the past, appreciate the present, and anticipate the future. .

It happened that when the Smith-Hughes Act was passed, I was principal of one of our county high schools and responsible for the intellectual and vocational development of about 300 Kansas farm boys and girls for the complicated business of living. They were somewhat more mature than average high school students, and I had a sort of vague and ill defined idea that the traditional school did not afford what they needed. It certainly did not afford *all* they needed.

It was natural, therefore, that I should be in the first meeting of high school principals called together at the state capitol to make plans for implementing the new vocational act, and my school was one of the very first approved. It is still the biggest little high school in our state.

A few years later the State Board for Vocational Education was looking for someone to serve as state director of the sickly and emaciated little program of vocational education. They gave me the job until they could find someone, and many of my friends went into mourning; they thought I had let down my net on the wrong side of the boat. That was 25 years ago, and they haven't found anyone yet. I relate this bit of personal history to bring to your attention the fact that I have seen vocational education grow from middle or late infancy through adolescence and come into adulthood.

When the Smith-Hughes Act was passed, there were three great teacher-training institutions in this country. One is on the West Coast, one on the East Coast, and one in about the middle. All of them were, and still are, doing a good job of training teachers for the schools of this country. All of them had dreamed of a day when there would be federal money available for the training of teachers, for they recognized, as many of us did, and still do, that inadequately trained teachers is a weak link in our educational system.

Accordingly they looked upon the Smith-Hughes Act as a *partial* answer to their prayers. Here was federal money for the training of teachers, and, of course, they expected a large share of it, for weren't they recognized as the outstanding teacher-training institutions in this country?

But when the law was interpreted, they found that it was available only to schools "under public supervision and control." They did not qualify, and here was a disheartening blow. And, as if to add insult to injury, they had to see a great part of the money apportioned to Land Grant Colleges, and Land Grant Colleges in *that* day were not considered educationally respectable in the area of teacher training. To these great and justly proud institutions, that was heresy of the highest order. That was academic wormwood and gall.

Small wonder, then, that no help or encouragement for vocational education has come out of those great institutions. Small wonder that school administrators who come under the influence of these institutions are exposed to a negative attitude toward vocational education.

There may be some who will feel that my reference to these institutions is petty complaining. To any who may feel so I can only say, you have not followed accurately and understandingly the development of vocational education in this country. What I relate concerning them is a very practical situation that has persisted through the years, and our most severe and persistent critics have come out of these institutions.

We in vocational education do not *resent* the attitude of these institutions. Indeed, we believe they may have served the *total* cause of education more effectively than if they had welcomed the arrival of vocational education with wide open arms. They have caused vocational education to justify its *every* step. And *any* new idea or program that affects so intimately the lives of as many people as are affected by vocational education *should* be required to justify itself. Furthermore, our critics served us well for they have cemented us together in a common cause.

We in vocational education hasten to say that in spite of this negative influence, a great majority of school administrators have thrown the weight of their positions, influence, and resources without reservation into the development of vocational education to serve the needs of their communities and of the country. To these we find it difficult to express our appreciation adequately. Vocational education could not have developed without their help. Even as well established as it is, it cannot survive or develop further without their support, and we covet that support.

But these same fine school administrators could not have developed a sound program of vocational education without men and women especially trained in the many

*An address given at the American Vocational Association Convention, Los Angeles, Calif., December 16, 1947.

areas of vocational education. It consists of several rather highly specialized fields and cannot function except under the administration and supervision of specialists.

School administrators are called upon to deal with a great variety of problems. Their training and their experience are of necessity too general to deal with the *special* problems in any area of education, including vocational education.

A school administrator finds it uneasy going, for instance, when called upon to make the necessary arrangements with labor and employers in setting up a program for training plumbers and machinists. Likewise, he finds himself out of his element when he attempts to develop the teaching content for a class of boys in vocational agriculture. Still greater would be his embarrassment if he attempted to arrange a class for adult farmers in feeding a dairy herd. He doesn't know the techniques, he doesn't speak the language. He would be ill at ease in their presence. *These* are jobs for specialists.

We are thoroughly convinced that vocational education in the areas in which it functions is a great *national*, as well as community, asset. If for no other reason we want to see it prosper as an instrument of national security.

In thumbing the pages of the history of vocational education, we come again to the enactment of the Smith-Hughes Law, and you will recall that it provided for a Federal Board for Vocational Education consisting of the Secretary of Agriculture, the Secretary of Labor, the Secretary of Commerce, the Commissioner of Education, and three citizens appointed by the President and representing labor, agriculture, and industry.

The machinery set up for the administration of vocational education under the board consisted of a director who was assisted by a chief of each of the services of agriculture, homemaking, and trade and industrial education. They, in turn, were assisted by four regional agents in each of the services.

Under this administrative arrangement, but without chart or compass, a program of vocational education was developed around the regional agent and in co-operation with the states that served this country exceedingly well, within the limits of funds, in both peace and war; in depression and prosperity.

Co-operation with the states is the keynote of the Smith-Hughes Act. It seeks to avoid federal domination and the board used every means and device within its power to make it truly a co-operative effort.

The regional agent was the contact person between the state program and the Federal Government. He knew the strength and weakness of the program in every state in his region. He knew the state director and supervisors in each state in his region, and they knew him. By reason of this intimate firsthand knowledge of the program and this professional friendship, he was able to render the professional assistance necessary to strengthen the weak spots in the program of any state.

There were times, of course, when we in the states did not see eye to eye with the regional agent on every problem, but the result of our discussions was a composite judgment which was better because of original lack of agreement. His information, experience, and counsel always resulted in better performance in the total program. Quite naturally, there were occasional instances of mildly unpleasant relations between regional agents and state people, but occasional irritations of personalities cannot be entirely eliminated in *any* system. In general, the regional agent system worked and got the job done with a negligible lack of harmony. Not only were federal and state relations pleasant, but state and local relations were highly satisfactory under the regional agent plan.

The work of the region revolved around this regional agent, and state relationship, and a natural development was the regional conference. These regional conferences served a highly useful purpose, for by means of the discussions which were the natural result of a dozen states meeting in conference, the development of the best in standards and practices and the elimination of the less useful were accelerated. The regional conference gave *substance* and *meaning* and *direction* to the entire program.

But a regional conference, the agenda for which do not stem from the problems of the region as recognized by the regional agent and the states within the region, is only half a conference, or even less. It works from the outside *in*, which is the wrong direction.

Furthermore, the regional agent audited the accounts of the state board and having intimate knowledge of every program within the state made it possible for him to audit not loosely, but strictly and constructively within the spirit of the law. A law so flexible as a vocational education law, must be interpreted understandingly and flexibly if it is to cover the great variety of situations intended. If it is to be useful and effective, it must be audited by someone who understands the spirit and purpose, as well as the letter of the law. Audits by unsympathetic auditors can result in federal control and domination of the most *damaging* kind. Under the now proposed auditing division it will cost 35 to 50 thousand dollars annually to do much less well what has been accomplished every year for 30 years by regional agents. *They* did it as an incidental to their professional visits.

But there came a new day, and the functions of the federal board for vocational education were transferred to the office of education in 1933, and the commissioner of education became, in effect, the federal board. From *that* time forward, vocational education has had a new and increasingly difficult fight for its existence. Efforts have constantly been made to integrate vocational education into the total program so completely that it would lose both its identity and its usefulness.

Everyone in vocational education who has found his stride knows that *no one* is at his best in *any* area or on *any* level of education until he has developed for himself a philosophy of education which includes everything that happens to boys and girls from kindergarten through college. We in vocational education want no less of effort spent in other areas of education. We recognize the urgent need for better educational opportunity in all areas and on all levels. We do not pretend to serve *all* educational needs. We do not understand, however, why educators in other areas should oppose or seek to hinder the further development of the admittedly important area of vocational education.

What we want, and indeed must have, is that vocational education be treated as one of the special areas and that it be kept vocational. What we want, and indeed must have, is that standards be maintained which will bear the close scrutiny of workers in the vocations for which we are called upon to train. To attempt to train for the skilled trades in a setup that does not meet the approval of the best tradesmen in a given trade is folly and suicide. To attempt to train boys in agriculture in a situation that does not have the respect of the best farmers in the community is the surest way to defeat the purpose of vocational agriculture. To attempt to train for *any* vocation in a setup that does not command the respect of the best workers in that vocation is the very worst of educational administration, and practice.

Standards in vocational education which have been developed through the years, largely by the trial and error method, must and shall be maintained. We cannot compromise in that particular, for to do so is to betray those whom we would serve. Since the transfer of the functions of the federal board for vocational education to the commissioner of education, there have

been constant attempts from every angle to change practices, policies, and standards, thereby frustrating and breaking down the entire program.

Vocations change, and we are often called upon to train for new vocations. Specific training within a vocation may change. Methods of instruction may be improved. But there are certain fundamental philosophies that we dare not vacate. There are certain standards from which we must not recede. There are certain principles we cannot compromise. Among them is the well-established principle of requiring that vocational teachers be occupationally competent and that they be supervised by occupationally competent people. Another is that the training situation approximate as accurately as possible actual wage earning job conditions. Still another is that learners be segregated with respect to the vocation for which training is to be accomplished.

It is no secret that the commissioner has lost no opportunity to foment chief state school officers and other school administrators against the plan of having vocational education administered and supervised by specialists. It is no secret that in certain states where the commissioner has greatest influence the pattern for state supervision follows very closely the plan his office has developed.

If the plan for administration, direction, and supervision by others than specialists prevails, we may as well admit that vocational education has reached its zenith and the road from here on is downhill.

It is no secret that no increase in appropriations under the George-Barden Act would have been made except for the fine work the state people did in co-operation with the American Vocational Association in bringing to the attention of the Congress the very urgent need for additional funds. And as a direct result of that effort there is reason to hope we may even get the full amount authorized in the George-Barden Act in our next appropriation.

It is a matter of common knowledge that more money was appropriated by the Eightieth Congress for the administration of vocational education than was ever appropriated before. It is no secret that part of that appropriation is being used for purposes that yield no dividends to the administration of vocational education.

Through the years an impressive company of stars has ascended into the vocational education firmament. Some have descended beyond yonder west horizon; some are still luminous but descending; some are ascending, but have not reached their zenith. A few "shooting stars" have ascended and shown with great light for a time and have then gravitated into other orbits. A few stars, alas, have lost their luster ere they set!

We name only a *few* of those who have played the leads. Time will not erase from the pages of vocational education history such names as Prosser, Allen, Wright, Cooley, Hambrecht, O'Leary, Dennis, Quigley, Mobley, Fife, Greiber, Baylor, Amidon, Fallgatter, Small, Getman, Brown, Hobdy, Woods. This list could be extended, and I realize the hazard of naming them at all, for some deserving person will be missed.

But among those named, a large share of the credit goes to Dr. J. C. Wright for holding the ship on its course after the administrative functions of vocational education were transferred to the Commissioner of Education. Because of his rich experience, his alertness, his patience, his unshakable faith, his educational statesmanship, and because he was enlisted in a cause and not merely employed on a job, he was able to hold fast without giving ground. And because he recognized it to be the function of his office to *co-operate* with the states rather than *dictate* to them, he was able to maintain high standards and a high morale in his staff.

In spite of constant attempts to dilute by integration, in spite of constant fomentation of the numerically small but vocal minority of school administrators against the administrative arrangement, we in the states were not too painfully conscious of an interruption in the whole program, so long as Dr. Wright continued as assistant commissioner in charge.

But as time marched on, retirement age caught up with Dr. Wright and he was called upon to pass the torch to other hands. As the time for Dr. Wright's retirement approached, speculation was rife among state people as to whom his successor could be.

We had just come through a great war in which vocational education had been called upon to train millions of workers in both civilian and military personnel. We had seen how important vocational education is to our country in war, as well as in peace. We knew that by training the workers necessary to produce war materials and food, vocational education had saved the lives of thousands of American boys and had materially hastened the end of the war. Heaven help us if we were called upon in the present state of administrative chaos to duplicate the national defense and war production training program which was done *so well* beginning in 1940 and continuing through the war! We knew how much vocational education was needed to retrain for peacetime vocations. We were anxious that it go on uninterrupted.

When the appointment of Dr. Gregory to succeed Dr. Wright was announced at our Buffalo convention in February, 1946, it met with rather general approval. One of the first things I did when I returned to my office was to write Dr. Studebaker a letter complimenting him on the appointment. I also wrote to Dr. Gregory congratulating him and pledging to support him in the further development of a sound program of vocational education.

But what we did *not* know was that a plan was already in the making which would almost completely demoralize the administration of vocational education and

A group in the cabinetmaking class of the Capitol Hill High School, Oklahoma City, Okla. Lonnie Gilliland, instructor

impair the fine relationships between the office of education and the states in the administration of vocational education.

We recognize the fact that the office of education has a great responsibility in administering so important a program as that of vocational education. We recognize the *legal* right of Dr. Studebaker and his staff to hand to the states any plan they choose, within the law, for the administration of vocational education, but, inasmuch as the program functions in the states, and through the co-operation of the states, we believe it would have resulted in much better relations if the states had been at least informed that a change was in the making. We do not understand why, if the plan were considered legitimate, it could not have been discussed with the states, *before* it was put into effect.

For the sake of emphasis, I repeat that co-operation with the states was a central theme of the Smith-Hughes Act and that co-operation was a motivating force in the minds of the men who implemented the act and administered it through its first 29 years of existence. All acts supplemental to the Smith-Hughes Act have referred to it for basic co-operative administration.

We do not resent change simply because it is change, nor do we resist change if we can be convinced that change makes for improvement. We do not even resent not being consulted in the development of the new plan. What we *do* resent is that we were called together in group conferences and handed an entirely *new* plan, effective as of that date, August 1, 1946, which we did not like at the time, and which has resulted, in less than a year and a half, in almost completely demoralizing the staff of the office of education and destroying the fine relations that had existed for so long between the states and the office of education.

Never in my experience have I seen the morale of the vocational division of the office of education so low. Never in my experience has it been so difficult to get professional service from the office of education. We in the North Central States get an occasional visit from a man designated as field representative. He is a fine man. He has been our regional agent in agriculture for many years. He knows agriculture and has rendered valuable professional service in that area. He does now, and we like to have him come. But he has been forced to *pretend* to give the same service in the other areas of trade and industrial education, homemaking education, business education and guidance as well as teacher training in all services. Just as any other man would be he is helpless and useless to us except in his special field of agricultural education. Never in my experience has this country paid so much for so little in the administration of vocational education.

It is a matter of record that the new arrangement costs from three to four times as much for administration as the old plan. Under the old plan we got results. Under the new plan we get only confusion and chaos. Never in my experience have the members of the staff of the U. S. Office been so silenced as now. They are not free to express their views on any matter of administration policy. Even the chiefs of the services are not allowed to communicate directly with state directors or supervisors concerning any administrative matter. They prepare such official correspondence for the signature of the assistant commissioner — a policy uselessly slow and cumbersome and inadequate.

Among other objectionable features, the new plan sets up an elaborate program planning committee. We in the states believe the program should be planned in the states, and by the states, and for the states, as has been done so effectively for 29 years previous to August 1, 1946, with such professional assistance as they need from the office of education.

Vocational education functions in Wichita and Kansas City and Tonganoxie and Buffalo and San Francisco and Los Angeles and Milwaukee and Boston and Atlanta; not in Washington. It functions in the cities and towns and rural areas; not in Washington. It functions where the boys and girls and men and women are, and not in Washington.

The new plan eliminates the regional agent. To us, the regional agent has been the key person. He has been the person who gave the professional help we needed. It eliminates the regional conference as it has been developed through the years, and a pitifully inadequate substitute has been forced on the states.

The new plan provides for almost complete federal control and a minimum of professional service. What we need is a minimum of federal control and a maximum of professional assistance.

It is not easy for me to say what I'm about to say, for the other day down at Wichita, the folk for whom I work — my staff and the Kansas Vocational Association — presented me with a bound volume of testimonial letters which are in recognition of my 25 years of effort in vocational education in Kansas. Even your president and your executive secretary extended themselves, as did many of you, to say something nice. Of course, I appreciate it more than I can tell.

But there was a letter in that volume from a man with whom I find myself at great odds in the matter of administration and supervision of vocational education. That man has been my friend through the years, and I've been his friend. I cherish his friendship, for someone has said, "He who has a thousand friends has not a friend to spare, but he who has an enemy will meet him everywhere." But I find myself in such violent disagreement with him that conscience goads me into bringing to you as nearly the true situation as I am able to do, regardless of friendship.

For more than a year, as chairman of your joint committee of the National Association of State Directors of Vocational Education and the American Vocational Association, I've gone all out in my efforts to discover what motivated this revolutionary change in administrative setup. With your support, I've been trying to get it modified. I've been trying to find out why the whole policy had been changed from one of federal-state co-operation to one of federal domination and control. It disturbed me no end, for I'd gone about telling our people that in vocational education there was a minimum of federal control and that such control as the Federal Government exercised was necessary to a healthy, useful program. The new plan gives the lie to all I've believed and preached. If it was *so* good for vocational education, why the great secrecy?

After we had sort of regained consciousness after the atomic pronouncement of August 1, 1946, we began to protest against the new order which was so unsatisfactory to the states.

We had several conferences with Dr. Gregory. We wanted a modification of the new plan. We wanted one that would work. We wanted one in which we could work.

Dr. Gregory was not unfriendly but uncompromising. He had sought no counsel. He wanted none. He would countenance no interference. It was his plan and he would see it through, regardless of what the states wanted. We de not believe him when he tells us it is entirely his plan. We believe it is the brain child of another man but since he insists that it is his and since it is so notoriously bad, we give him the credit. He was sure he could get the increased funds necessary to put the plan into effect. He appears to feel that he knows more about what vocational education needs than all the vocational education people of all the states combined. We got exactly nowhere.

It isn't difficult to believe that Dr. Gregory had accepted the appointment as assistant commissioner, a fine promotion for him, on the condition that he accept full responsibility for the new plan, for it

fits perfectly into the pattern the commissioner had sought to establish from the beginning of his administration. It cuts the pattern for integrating vocational education into the whole program of education to the extent of its completely losing its identity and putting it under the administration and supervision of men and women untrained in the areas in which they would supervise. That would be fatal to vocational education, and would betray the boys and girls and men and women who should be benefited.

When we realized complete failure to get any consideration from Dr. Gregory, we sought conference, through our executive secretary, Dr. Dennis, with Dr. Studebaker, but were brushed off.

We were so deeply concerned about the future of vocational education that, failing in our attempt to get a conference with Dr. Studebaker, we sought a conference with the Hon. Mr. Ewing, director of the federal security agency. We were granted a conference on September 11, 1947. Mr. Ewing received us graciously and listened intently. He asked many constructive questions obviously for the purpose of getting the information he needed. As a result of our conference, we have a high regard for Mr. Ewing's intelligence and integrity but we were disappointed when our executive secretary, Dr. Dennis, received a letter from him recently in which he asked that we give the new plan further trial. We are unwilling to give it further trial because of what we have seen happen to vocational education in the 17 months it has been in effect.

We do not believe Mr. Ewing will resent our continued efforts to correct what is to us a very great wrong.

It is my opinion that the commissioner and his assistant, the director of the division of vocational education, have entirely lost the confidence of the vocational people of this country. We cannot go forward constructively unless they can recapture that confidence and bring order out of the chaos that exists. They are entirely out of sympathy with what we in the states think is good administration in vocational education.

I do not know whether there is a man or woman among you who will go along with me, but because this situation is so intolerable I'm calling on you to join with your American Vocational Association in seeking congressional approval of *some* administrative arrangements for vocational education which will function in the states, as well as in Washington, and which will make it possible for us to serve the boys and girls and men and women for whom the vocational acts were intended.

I do not believe Congress will appropriate funds for the promotion of vocational education and then fail to provide an administrative setup that will assure their expenditure for the purposes for which they are appropriated.

Earlier in this discussion, I said the American Vocational Association is the most effective organization of its kind in the world. I repeat it, for I believe it. Its effectiveness lies in the fact that it is a team. It is not merely 25,000 individuals, but a team 25,000 strong. It is effective because every member of the team has a host of friends, many of whom are themselves members of great national organizations, eager to support a sound program of vocational education. They look to the American Vocational Association for leadership and seek opportunities to lend a hand. The membership of the American Vocational Association believes that, "The strength of the pack is the wolf, and the strength of the wolf is the pack."

To the end that we may continue to function effectively in the interest of a bigger and more useful and better administered program of vocational education for both youth and adults in this country, I appeal to you to continue as a team.

I do not know an organization in which there has been less evidence of selfishness. Seldom have I seen any evidence of any individual seeking selfish ends. Seldom have I known anyone in it to be a candidate for office. The office has always sought the individual best suited to do the work at hand. It should always be so. In my opinion, no person who is an avowed candidate for office in it should be elected. I consider it unethical and unprofessional, and not in the interest of the "pack," for any person to seek an office in an organization of this kind. Let the organization decide its direction and determine the work to be done, and then let it choose from its membership the most logical person.

We are of necessity made up of members representing a considerable variety of services, but that fact does not need to lead us into the development of pressure groups which could detract our attention from the real issues. In my opinion, it is a deplorable situation when two or more of these groups band together to trade voting power in electing officers or deciding issues.

In every big league game, one man at a time carries the ball and all the others of the team run interference for him. You are in the big league. You are playing for big stakes. You are playing with the destiny of a big program. You are playing with the destiny of thousands of youth and adults, and maybe with the destiny of civilization itself, for it was education in *this* country that won the war for the democracies. If the peace is secured, it will be education in *this* country that makes it secure.

Pupils of a boys' school in the Toggenburg near St. Gall, Switzerland, enjoy their art class

— Courtesy, C. Schildknecht, St. Gallen

Vocational education is a vital part in the total program of education. For the sake of national security let us keep it strong.

How will you play your part in this big league game? Are you willing to run interference for the fellow who is carrying the ball, or must you carry the ball to do your best in the game?

Vocational education stands at the crossroad. If it turns to the right, it crosses the threshold of the greatest peacetime opportunity it has ever had to serve both youth and adults of this country. If it turns left, we may as well pause and with uncovered heads and saddened hearts erect a marker for posterity. On it we should inscribe, "Here lies the remains of what *was* a great and useful program of vocational education. It died at the hands of men who injected into its veins a harmless appearing substance called 'integration'!"

The National Program of Apprenticeship*

WM. F. PATTERSON
Director of Apprentice-Training Service
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Washington, D. C.

Evidence abounds on every hand that never before in the history of our country has there been so great an opportunity for the development of apprenticeship — and never was there a greater challenge to those charged with responsibility in apprenticeship — than exists today.

Members of the American Vocational Association know that in spite of their vigorous efforts we have not been training enough apprentices to maintain the skilled work force, to say nothing of adding to it to meet the requirements of our expanding industry. The average age of craftsmen has been leaping upward as a result. While apprentices must be trained at all times to keep pace with the needs of industry, their training is of the utmost importance today because of the pressing need for high production.

Maximum productivity will greatly help control the price spiral, thus helping to avert inflation and all the evils and suffering that accompany inflation. There is for us in the United States at this time another reason why we should strive for maximum productivity. We must produce more than ever before to meet our commitments under the Marshall Plan so that democratic nations in Europe can maintain their freedom and at the same time produce enough for home consumption.

Apprentice trained craftsmen are essential if we are to achieve the goals set for production. They know how to use tools most effectively, they know all of the operations of their trade, and they prevent waste of materials. Dan W. Tracy, president of the International Brotherhood of Electrical Workers, recently called attention to these facts when he said: "The great question of productivity in the last analysis rests upon the apprenticeship program."

Management Also Aware of the Importance of Apprenticeship

Management is no less aware than labor of the immeasurable importance of apprenticeship today. An editorial in the November 27 issue of the *Engineering-News Record*, a leading national publication, stressed the value of apprenticeship in reducing building costs. The editorial stated, in part:

"Everybody is blaming the other fellow for the high cost of construction in current Congressional hearings, and there appears little that any individual or organized group can do about it because such a multitude of factors affect building costs. But there is one place where the individual contractors can help, and that is in training apprentices. This (training apprentices) can only be done through the help of contractors who are willing to take on men for apprentice training. The need is great especially in small cities. Here is a concrete opportunity to help bring construction costs down." The editorial writer might have added that not only do apprentices augment the skilled work force of the future, but they become producers as soon as they go on a job and their productivity increases as they acquire more skills.

The special need for maximum and quality production at minimum costs brings to mind three major points in connection with vocational education.

1. Vocational education, and other public agencies compared with apprenticeship and industry should strive constantly to improve teamwork in advancing the cause of apprenticeship.

2. Vocational education should do all in its power to furnish related classroom instruction to all apprentices in all localities.

3. Vocational education should keep the related classroom instruction up to date to meet the changing requirements of industry and give instruction of the highest quality.

Apprenticeship and Vocational Education a Natural Team

Apprenticeship and vocational education constitute a natural team; they complement and reinforce each other. As both are essential in the development of thoroughly skilled workers, teamwork between the two groups is of paramount importance.

As director of the apprentice-training service, the writer is in a position to say that co-operation between apprenticeship and vocational education is excellent and is constantly improving. Wholesome and effective relationships exist between the trade and industrial education division of the U. S. Office of Education and the apprentice-training service. Especial tribute is due to Layton S. Hawkins, former chief, Trade and Industrial Education, U. S. Office of Education, and a member of the Federal Committee on Apprenticeship until his recent retirement from government service. The same fine co-operation and assistance which were given by Mr. Hawkins and his staff are being given by his successor in the Office of Education, Walter Cooper, and his associates.

While teamwork between national agencies and associations has proved a *must* first step in the successful promotion and operation of apprenticeship, it is even more important that teamwork between vocational education and apprenticeship is of a high order in the states and communities. The real job to be done is a local one. It is locally where we must have the closest co-operation possible between vocational education, joint apprenticeship committees, and state and national apprenticeship agencies if apprentices are to receive the related instruction they *must* have to become real craftsmen.

American Vocational Association Giving Valuable Service

The American Vocational Association is effectively aiding the National Program of Apprenticeship, and through its official magazine, the *American Vocational Journal*, is doing an invaluable service in publicizing the need of sound apprenticeship and what it offers to youth planning their lifework. May I suggest that the

*Address delivered at the annual convention of the American Vocational Association at Los Angeles, Calif., Dec. 18, 1947.

A.V.A., through its *Journal* and the membership through local contacts, continue to stress the necessity of teamwork between vocational education and apprenticeship in the cities and the states where the actual problems must be solved.

The construction industry has set a fine example of teamwork in apprenticeship. It has amalgamated all the major forces which impinge on apprenticeship. The contractor associations and labor unions, having the primary responsibility, have drawn into their councils and have successfully enlisted the aid of building supply manufacturers, architects, engineers, trade publications, and the industrial education fraternity.

Co-operation between national contractor associations and international unions has resulted in the formulation of National Joint Apprenticeship Standards for 13 trades which cover all of the major crafts in the building industry. Genuine progress is being made through the co-operation of the groups mentioned, State Apprenticeship Councils and the Apprentice-Training Service. On November 1, ATS had record of 109,738 apprentices, an all-time high, in the building trades. This total was compiled from 5693 reports from all parts of the country but does not represent complete coverage. The number of employers in the construction industry participating in apprenticeship also has established a record.

17 Per Cent of Building Trades Apprentices in California

Of the number of building trades apprentices listed on November 1, California had 19,247, or more than 17 per cent, and the Los Angeles metropolitan area had 9913, or 9 per cent of the national total. Much credit for this excellent accomplishment is due to the California Apprenticeship Council and its able and militant leader, Archie J. Mooney. The California Bureau of Trade and Industrial Education and its director, Samuel Fick, also are to be commended for the fine co-operation and assistance given to provide related classroom instruction for apprentices.

Every apprentice should receive this most necessary classroom instruction. But we know that this is not the case. At the last meeting of the Federal Committee on Apprenticeship, September 18, considerable discussion was devoted to this problem. Of interest to vocational educators will be the fact that the discussion revealed the opinion that in one section of the United States not more than 50 cent of the registered apprentices were receiving related instruction.

Part of this deficiency was attributed to the fact that joint committees, employers, and apprenticeship agencies have not been insistent enough that apprentices attend the classes made available to them. However, there were cases reported where apprentices were not getting related instruction because no class facilities were available for apprentices. This problem is not a simple one and there are many hurdles to be overcome.

But individual states are moving to meet the challenge through one device or another, such as the employment of itinerant instructors and the establishment of accessible training centers. Surely, in view of the desperate national need of skilled mechanics extraordinary measures to provide related instruction are warranted and commendable.

Instruction Should Be of High Order

Every effort must be exerted so that maximum production may be achieved. This means that the related instruction given to apprentices must be of a high order. Inasmuch as the writer came to his present position directly after seven years with the Milwaukee Vocational School, he still considers himself as a vocational educator. As such, he has been disappointed at the failure of vocational education to provide adequate related instruction in many communities. He meets each year with more than 35 national trade associations and a large number of labor and other national organizations concerned with apprenticeship. Frequently delegates to these conventions tell him that they are not satisfied with the quality of the related instruction which has been provided. Twenty-five of the largest American companies could be named, which provide related classwork entirely under their own auspices and at their own expense. Surely, if vocational education were fulfilling its responsibility in this field everywhere, these companies would not by-pass the established public facilities.

In discussing this problem with leaders in management they have told the writer that: (1) school instruction is not kept current with advanced methods and new materials in the trades; (2) local vocational programs lack flexibility. That is, they are able to give apprentices instruction only at certain hours and many schools cannot give instruction unless there is at least a class of ten for each trade; (3) there is a lack of necessary relationship between the trade and the subjects taught in the schools.

Being in Los Angeles the writer cannot refrain from mentioning the superb performance of the Frank Wiggins Trade School in both apprenticeship co-ordination and related work. So respected are its co-ordinators and instructors that they are constantly sought as speakers for national trade conventions.

It is not the purpose of this article to be overly critical of related instruction in apprenticeship. But there are phases which should be improved, as has been pointed out. It must be stated, however, that with the expansion of apprenticeship the related classroom instruction also has expanded and improved generally. There are more apprentices receiving instruction in the schools than ever before and the quality of the instruction and subjects taught is improving.

The National Situation in Apprenticeship

The great accomplishments in the construction field have already been pointed out, but even in this industry national leaders agree that much more remains to be done: more joint committees and more apprenticeship programs should be organized and more apprentices should be trained.

Industries other than construction are working to formulate national standards by trades. The managements of three railroads and the Railway Employees Department of the AFL with which they have bargaining agreements have adopted system-wide national apprenticeship standards during the past year. These are the Union Pacific, the New York Central, and the Western Pacific. Excellent co-operation of the U. S. Office of Education and State Boards of Education was a major factor in the formulation of the high standard related instruction which was incorporated in all three railroad apprenticeship programs.

Nationally, trade associations and unions are doing more than at any time in our history to achieve an adequate national program of apprenticeship. The chief objective is to get all communities, large and small, to set up adequate apprenticeship programs and train the apprentices they need to maintain the required skilled work force.

Because of an urgent shortage of skilled man power in the building trades in many localities, joint trade apprenticeship committees in co-operation with local vocational schools have set up accelerated training programs. Under these special programs new apprentices spend six to ten weeks full time in school to get an acquaintance with fundamental procedures in the trades and particularly with the handling of tools.

Apprentices in these programs were all carefully selected and all bore evidence to

the value of this preliminary training when they later were employed on construction or maintenance work. Those interested may write for a copy of the booklet entitled "Accelerated Training in Apprentice Training Programs for the Building Construction Industry." It is published by the Associated General Contractors of America, 1227 Munsey Building, Washington, D. C.

Apprentice-Training Service Has 200 Field Offices

To implement the activities of trade associations and unions, the Apprentice-Training Service has stationed full-time field representatives in 200 local offices in the country to give technical advisory assistance to joint committees, to management, to labor, and to others interested in apprenticeship. Likewise, many state apprenticeship agencies, including California, now have a staff of full-time field representatives. The effectiveness of such technical advisory service is dependent on the selection through Civil Service of men thoroughly qualified and whose appointments are in no way affected by other considerations, who have a reasonable expectancy of making this work a lifetime career, who are reasonably well compensated, and whose appointments are of such permanent character that a degree of security is afforded.

The job ahead is to work for even better teamwork between vocational education and apprenticeship, to see that all apprentices get related instruction, and that this instruction is adequate, and really helpful to the beginner.

Methods of Teaching Occupational Subjects

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(Continued from page 90 of the March, 1948, issue)

The 4-Step Lesson

The 4-step lesson has been used in vocational schools for the past 25 years to teach shop and related subjects. Since the problem of putting over a 4-step lesson in a related subject is somewhat different from that in a shop lesson, this material deals only with the 4-step lesson in teaching shop lessons.

The 4-step lesson is comprised of the following four steps:

1. *Preparation*
2. *Presentation*
3. *Application*
4. *Test*

In the *preparation step*, the shop instructor, after assembling all materials, supplies, etc., for the lesson, prepares the students by gaining their attention and arousing their interest in the lesson.

In the *presentation step*, the shop instructor puts over the manipulative part of the lesson by the use of a demonstration.

In the *application step*, he has the students perform, individually, the same manipulative part put over in the presentation step.

In the *test step*, the shop instructor tests the work of the students.

In shop and related subject lessons, there are *two lines of approach* that should be used with the 4-step lesson. They are as follows:

1. *Developmental line of approach*
2. *Informational line of approach*

The *developmental line of approach* is used with the 4-step lesson when teaching *shop lessons*, and the *informational line of approach* is generally used in teaching *related subjects*. In other words, when *teaching manipulative skills*, the developmental line of approach is *always used*. We shall show later what we mean by the developmental line of approach when we discuss, in detail, the presentation step in the 4-step lesson.

There are *two methods* that can be used to teach 4-step lessons, thus,

1. *Demonstration method*
2. *Verbal instruction method*

The demonstration method is the proper method to employ in teaching a lesson involving manipulative skill, which means that the shop instructor should always use the *developmental line of approach* and the *demonstration method* when teaching a shop lesson.

The developmental line of approach means exactly what it says; that is, the presentation step is developed by the students and the shop instructor, the latter acting as the leader, in which capacity he steers the students in the development of the procedure involved in the performance of the job. Of course, the question arises as to how the instructor, acting as a leader, can accomplish this in the presentation step. The answer is that the shop instructor uses *questions* to develop the procedure.

Of course, the shop instructor can tell and show (showing means the use of the demonstration method) the students how the job is performed. This is often the procedure used by the shop instructor to put over the presentation step, but it is not the most effective procedure. The developmental line of approach is not used, and, as a result, the students do little or no thinking. To make telling and showing effective, they must be accompanied by questions, which stimulate the thinking of the students, keep them on their toes, and, at the same time, develop step by step the procedure involved in the performance of the job. Telling, showing, and questioning may require more time than telling and showing alone, but the students are active, not passive, and any additional time required in the presentation step will be more than compensated for in the application step.

We can summarize the foregoing as follows: the *demonstration* method and the *developmental* line of approach are used in the presentation step of all shop lessons: the *demonstration* method involves telling and showing; the *developmental* line of approach involves questioning.

We shall proceed to develop a lesson plan for a 4-step shop lesson, starting with the job analysis of the shop lesson, followed by the preparation, presentation, application, and test steps, the lesson plan, and the operation sheet.

The Analysis of the Shop Lesson

One of the first things the shop instructor should do when he starts to teach is to analyze his trade to determine what should be taught in the shop. *This analysis of the shop lesson forms the basis of the lesson plans used to teach all shop lessons.* In fact, the shop analysis should serve the same purpose in shop instruction as, for example, a plane geometry book serves in

teaching a class in plane geometry; that is, *the shop analysis is the shop instructor's textbook*. Without this shop analysis, the course of study actually followed in the shop is oftentimes poorly organized.

To illustrate the development of a 4-step lesson plan, we shall use a lesson unit from the drill press in the machine trade. In this analysis which follows, column one contains the title of the shop lesson, which is plain drilling flat work (series of holes same size). Following the title of the lesson, the various methods of holding the work are listed. Column two lists the operation steps that must be performed by the shop instructor during the presentation step. Column three contains the information points that the shop instructor must put across during the presentation step. These information points have the same numbers as the operation steps to which they apply. For example, there are two information points to be put across to the class when the first operation step is taught. Likewise, when operation step number two is taught, the shop instructor must put across the two information points headed by number two.

Columns two and three show the rough blueprint of the lesson. In fact, they show the presentation step in detail, and they can be used as the blueprint to be followed in putting over this step. This is nothing more than a page out of the machine-shop analysis, or, in other words, a page out of the shop textbook. From this page, we shall develop the *four steps* in the 4-step lesson, the *lesson plan*, and the *operation sheet*.

(To be continued)

Machine-Shop Analysis — **Block IX. Upright Drill Press**

Lesson unit (operation)	*Operation steps*	*Information points*	*Tools, supplies, and equipment*
Unit E	*a) Mounted on table*		
Plain drilling flat work (series of holes same size) *a)* Mounted on table *b)* On vise *c)* On V block *d)* In drill jig *e)* On angle plate	1. Clamp work on parallels.	1. Remove sleeves, rings, neckties.	1. Drill press 2. Taper shank drill 3. Clamps 4. Bolts 5. Shims 6. Wrenches 7. Small gauge 8. Center punch 9. Hammer 10. Oilcan — coolant 11. Bench brush
	2. Center-punch all layout centers.	1. Clamp securely. 2. Check layout. 2. Center-punch each hole to start drill.	
	3. Insert drill.	3. Check drill size.	
	4. Set speed and feed.	4. Drill speed: 4S / D = r.p.m.	
	5. Unlock table and position approximately.	5. Use care in pulling over table.	
	6. Start machine.		
	7. Advance drill by hand, take trial cut.	7. Depth of trial cut.	
	8. Pull over table if necessary.	8. Recenter punch.	
	9. Lock table, lock feed.		
	10. Drill through work.	10. Do not drill into table.	
	11. Repeat 5, 7, 8, 9, 10 for remaining holes.		

Mental Cramps of the Engineer Writer

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(Continued from page 121 of the March, 1948, issue)

Imagination

Too many engineers seem to have stopped the culture of their powers of imagination, which were nursed in the delightful atmosphere of Anderson and Grimm of their childhood. A man who has continued to draw mental images — to imagine things — once said of a certain chapter that was in production: "First tell the reader of the basic cause and ultimate effect — when you twist the monkey's tail, the monkey jumps; that is, when the handle of the local power control is rotated, the main gate is moved accordingly. Then describe the intermediate steps — when you twist the monkey's tail, the nerves therein send an impulse to his spinal reflex center, advising him to jump. Thereupon the center signals his leg muscles, and he does jump. Now the reader is ready to be told how the turning of the local power control causes the servomechanisms system to send signals which, when amplified, cause the power unit to operate the gate gearing system (the muscles), thus operating the gate." A skillful technical writer looks for simple analogies that will convey his ideas more quickly. Imagination must be disciplined, however. The analogy must be basically accurate; it must not be subject to major exceptions that would confuse the reader.

It is desirable to imagine the detailed steps whereby the operator studies the book. His two-digit study of an intricate part should be visualized, with one finger spotting the picture of the part, while the other traces the accompanying text and parts list. The text should expand, not duplicate, the story that the picture tells. The writer should visualize a copy of the book after it has been studied by a conscientious operator. Words and sentences will be underlined. Can the writer not combine such interlineations into a short introductory paragraph, and follow this with the less important details? The writer, recalling his own occasional disgust, will avoid delayed-fire definitions of terms needed earlier.

Vocabulary

Some of us engineers need to cultivate a wider acquaintance with our dictionary and thesaurus. It is often true that awkward writing is due to the meager vocabulary of the author. Such a writer will be surprised at the elimination or torturous phrases made possible by an enlarged list

of words from which to choose. Awkwardness means "turning the wrong way" — not an effective way to reach the understanding of a hard subject.

Thrift

While verbosity is not an engineering trait, there are some who should practice economy of the written word with more diligence. The writer must be efficient in putting across the ideas to the man who is to read the book. The efficiency of the written presentation is measured by the mental energy consumed by the reader in mastering the subject. It is hard going at best, the learning of the functions of operation and maintenance of complicated mechanisms. Hence, there is the great incentive to save the reader's mental energy, which, for many persons, is measured by the physical, subvocal effort, as an abtruse subject is studied.

In a syllable-by-syllable analysis, one should, therefore, strive to save mental energy by reducing the syllables to a minimum. Parsimony must be avoided in this process, however. It is not economical of the reader's energy to make him supply phrases or words that were omitted through the writer's overemphasis on thrift. To say that "ten-dollar words are out" would also not be playing cricket with the reader. As part of the task is to teach him the vocabulary of the subject, the polysyllabic names of engineering apparatus cannot be avoided. Two helpful suggestions are obvious. At the first mention of one such jawbreaker, it can be defined, in as cleverly simple terms as possible. Then, of course, there should be a glossary.

Style

Textbooks on engineering subjects have trained engineers to a style of writing that is ill suited to the manuals of industry. Perhaps, the bulk of such writing is aimed at mechanics — men who, with happy exceptions, don't become enthusiastic at the excellent examples of stylistic writing of the *Atlantic Monthly* type. The value of the impact of colloquial expressions on shop mechanics, servicemen, and operators cannot be neglected. The use of apt colloquialisms is to be encouraged; also, the use of the "you" of the second person. Skill of a high caliber is needed to introduce such virile methods and still avoid sloppiness. May we at least agree to use only such informal expressions as have found their way into the dictionary, and are defined as colloquialisms? Perhaps we may be contributing to the healthy growth of the English language by our skill in producing grammatically correct text, well spiced with such expressions.

We can, of course, presume that the engineering graduate who is to become a technical writer is grammatically literate. Still, is it a professional insult to suggest a college refresher course in grammar?

Practice

Engineers who delight in the practice of solving abtruse mathematical problems do not seem to realize that good writing also comes from conscientious practice. It is not only important to learn the principles of English composition; it is necessary to acquire proficiency in their use by extensive practice. Students of engineering colleges, eager not to neglect important engineering subjects, are likely to relegate the subject of English to a low position of importance. This is unfortunate, for only a genius can be condoned the lack of ability to convey his knowledge by facile expression. Young engineers and their bosses tend to think of this ability as a natural trait: either a man has it or he hasn't. We should abandon this attitude of defeatism, and, admitting that technical writing is difficult, determine to instruct the undergraduate in its principles. Journalists and authors will testify that practice was required to become proficient at their vocation. Such practice need not be tedious. Word mechanics can be a fascinating vocation, and, as in all professions, the time spent in practice is worth while.

Drama

Engineers who enjoy an evening at the theater should realize the intangible value of drama in their daily tasks. Those who are successful in putting across their ideas use drama, whether they realize it or not; for drama is the catalyst that accelerates the reaction of human contact by written expression or speech. The technical writer who understands dramatic processes is therefore better equipped to reach the reader than one who does not possess this knowledge. Subconsciously, such a writer's book will reveal the dramatic thread of progress — opening, development, and climax. Sequence will not be violated; location will be established at the start; and atmosphere is assured by the vivid pictures. Expository writing will be more effective if produced by a man versed in the knowledge of the dramatic elements. Need it detract from the aesthetic atmosphere of the class in Shakespeare to emphasize this practical application of drama?

Sympathy

In their stratosphere of advanced scientific learning, engineers often lose sight of the one-syllable ground areas of daily life. A brutal purging of the love of high-sounding phrases is an essential step in the training of a technical writer. The appalling vocabulary of engineering subjects must be simplified and the usual erudite diction of the college classroom reduced to terms that the mechanic will quickly grasp. Sympathetically, the writer must put himself in the shoes of the mechanic who didn't go to college, but whose knowledge of the "feel" of the machinery may be superior to his own. "Why don't you write like you talk?" is a common editorial complaint when a writer has made clear orally his obscure written exposition of a complex mechanism. The writer must imagine himself talking to his reader and develop a style of writing that will approximate his oral story. He must avoid "talking down" — the adoption of kindergarten methods, insulting to the reader, as well as ridiculous to the expert who happens to pick up the book. The attaining of a sympathetic state of mind — writer to reader — is essential.

The Newspaper Way

The occasional lapses from the ways of truth by certain newspapers may have prejudiced exact-thinking engineers against the value of many journalistic methods. Generations of newspaper editors have evolved a universal story structure, which is ultraefficient as a medium to describe the incidents and events of a happening to the greatest number of readers. Certain of its principles are inherently suited to the needs of the technical writer. The ability to condense into a brief lead paragraph a summary of what is to follow should be invaluable to him. He can use his own good judgment as to how far he should go in thus presenting at the start the five "W's" of the story: the who, what, when, where, and why. The principle of the terse journalistic headline also can well be followed in selecting the titles and captions of the illustrations. An introduction to the principles of journalism is therefore a worth-while study by the technical writer.

The Opportunity

"Lord help us! Is the English professor expected to teach philosophy, drama, philology, journalism, and public relations?" Does the layman hear this exclamation by the college executive who has read the foregoing remarks anent practical technical writing? The answer is that the successful writer of technical text subconsciously calls upon his knowledge in these fields of learning. He learned these principles somewhere, and there is an urgent need of more extensive general instruction in them. Certainly, the English Department appears best qualified to cover this wide field in a summarized form. The opening of

fascinating vistas of the field of general knowledge can serve as a vehicle to convey the main thesis — the teaching of the art of English expression. The forebears of the professor of English taught others of their generation how to record the advances of knowledge by methods of expression, lacking which there would be no knowledge. The present plea is that the engineering profession become more efficient in the process of written expression.

The searchlight of publicity has been focused on our present inefficient methods. May we quote *Time* as it discusses the delightfully whimsical Turbo Encabulator? "He (the Scientific Editor) was merely giving wider circulation to the engineering firm's kidding the mumbo-jumbo language in which too many scientific treatises are written. He was also, by implication, making a plea for a simpler, clearer use of the King's or any other English."

Good-natured ridicule is often helpful. It penetrates the skin of self-content and stimulates the desire to improve faulty methods. By making fun of the engineer's tendency toward mouth-filling phrases which, like medical jargon, often seem designed to confuse, *Time* has rendered a valuable service to the professor of English and to the layman who depends upon him for proper instruction in the art of expression.

Some Leaders in Industrial Education

(Griffith — Concluded)

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(*Continued from page 48 of the February, 1948, issue*)

Use of the Textbook in Teaching Shopwork

The limitations of this sketch do not permit a discussion of the place of the textbook and other printed and written instruction materials in the teaching of shopwork. It is sufficient to note that there are techniques in the use of the textbook in teaching shopwork, both in industrial arts and in trade teaching, which must be mastered. The use of a textbook does not eliminate or reduce the teaching function of the teacher. It does not mean less effort, or lighter demands on the time and energy of the teacher. It does mean, for the skilled teacher, more effctive use of his teaching skills, more lasting results, and greater accomplishment in a given time.

There are, of course, many shop teachers who do not use textbooks. I have visited many school shops in all parts of the country, and in Canada, and only a small minority of the teachers visited were using textbooks. At the same time there has in recent years been a notable increase in the number and size of "shop libraries," and the use of reference and supplementary reading materials.

Probably the most common reason given for not using a textbook is, "No one has written a textbook that exactly meets the requirements of my shop, my pupils, and my course of study." Possibly it never occurs to some teachers that their shops, their teaching methods, and their courses of study are in need of improvement, and that the needed improvements might be brought about by stepping up their programs through the adoption of the ideas and methods of more highly skilled and better trained teachers.

A more significant reason for reluctance to use a textbook in teaching shopwork is that the teachers themselves were not taught in that way.

To get back to the subject of this sketch, Griffith developed the necessary techniques for using shop texts, and he achieved notable success with them. He had his reasons for the methods and techniques he used, and he presented and discussed them convincingly at meetings of shop teachers.

A Prolific Writer

Griffith's success with a textbook in his own shop, and the experiences of other teachers, encouraged him to proceed with the carrying out of other plans. His first book was followed four years later, in 1912, by two others which added still further to his reputation and influence, namely: *Projects for Beginning Woodwork and Mechanical Drawing; Advanced Projects in Woodwork.*

At about the same time, later in 1912, a fourth book appeared, entitled *Correlated Courses in Woodwork and Mechanical Drawing*, which encouraged the teaching of drafting in connection with shopwork. Griffith also emphasized the important relationships between the content of manual training and other subjects in the curriculum, including mathematics, language, geography, history, physics, and others. "He convinced many schoolmen that manual training could be correlated with other school studies and could have educational value equal to the best of the others."[2]

Correlated Courses

In his constant search for something practical, something that would "work," he explained in the Preface of this book that in its preparation he depended "more upon the art of practice of teaching manual training than upon the theory. . . . Wherever plans, or theory, were found producing results which common sense indicated plainly were not for the pupils' highest good, practical expediency supplanted theory."

To single out one interesting example of method, he advocated the use of the "exercise" piece, a suggestion derived from the Russian system of tool instruction. If a boy was about to begin the construction of a project involving the mortise-and-tenon joint, he would have the boy select two pieces of wood from the scrap-box and make an "exercise" mortise-and-tenon joint, before cutting into the oak or mahogany or walnut that is to go into the finished project. It is worthy of note that this method of teaching seems to be coming back into favor after an eclipse of 20 years or more.

The writing of this book, *Correlated Courses,* was prompted by his conviction that both woodworking and mechanical drawing possess subject matter to be taught and learned, that these subject matter fields are vitally related, and that "it is desirable to have an orderly arrangement of material if learning is to take place economically."

This book was also, in part, a protest against the extremes to which the psychologists and the "child-study" zealots had gone at about the turn of the century. Griffith deprecated what he

[2]Bennett, *History*, p. 445.

called "the exaltation of the individual and the reign of the self-expressionist," when carried too far. He believed that the decision as to what should be included in the curriculum involved something more than consultation of the wishes and interest of the child.

At the same time, Griffith recognized that the element of skill had been unduly emphasized in the manual training based on the European importations, the Russian system of joints and exercises, and the Sloyd system of useful projects, from Sweden. In both cases, these foreign systems were incorporated at first almost bodily into American schools, with inadequate or imperfect adjustment to the genius of our people, and to the accepted objectives of American education.

Griffith studied this problem of adjustment and balance with great care and at considerable length. He recognized genuine educational values in both approaches, which should be harmonized and conserved in some way. In this connection he wrote:[3]

"The practical application of a system that would make the most of each of these elements has been a source of no little disappointment. Effort in one direction seemed always to result in a sacrifice in the other. That is, when the thought side is emphasized there is a falling off in the accuracy of the results. When skill is magnified, it is attained only with a sacrifice of the thought element. With many misgivings the conclusion was reached that the introduction of original thinking on the part of the pupil must mean some sacrifice on the skill side.

"We may conclude that it is desirable to organize our work and to have courses in woodwork and mechanical drawing and that, whatever system is adopted, it must make allowance for emphasis both upon the thought element and upon skill. . . . It is hoped that out of our past experiences with the joint-making Russian system with its admitted disciplinary value, the Swedish modelmaking with its effort to utilize the energy of the worker toward useful products, and the self-expression of the pedagogical movement with its attendant elements of interest and initiative, there may come a manual training practice that shall be marked by a combination of the best of these elements, with a consequent elimination of the weaknesses of each."

Characteristics of a Good Course of Study

One feature that received a great deal of attention in conferences of industrial-arts (manual training) teachers of this period (1905–15) was a new plan of arranging the projects to be made by pupils according to a progressive series of groups. For example, a typical course of study would provide that Group III should include the introduction of a certain new tool (perhaps more than one), with suggested new processes or operations to be mastered, together with certain blocks of information to be acquired, assignments for further reading, study, and report.

The pupil who was ready for Group III would be permitted to choose, with the advice and assistance of the instructor, a project from a group of projects of varying degrees of size and difficulty, each of which incorporates the new processes or operations, and involves the use of the new tool or tools recommended for that Group. The pupil who had up to that point demonstrated ability to progress more rapidly and more satisfactorily than the average would be permitted and encouraged to select one of the more difficult projects, or one requiring more time for completion. A slower or more painstaking pupil would be expected to select a project more in accordance with his ability.

Griffith was one of the leading spirits in a committee, of which Charles A. Bennett was chairman, created by the Illinois Manual Arts Association, which prepared the outline for woodwork that was incorporated in the Illinois State Course of Study for the Public Schools, published about 1909 by the State Department of Public Instruction, Springfield. The Introduction to this outline is worthy of study by another generation of industrial-arts shop teachers 40 years later.

"Any course in woodworking worthy of a place in the eighth and ninth grades of public school work should meet the following requirements:

"1. It should arouse and hold the interest of the pupils.

"2. Correct methods of handling tools should be taught so that good technique may be acquired by the pupils.

"3. Tool work should be accompanied by a study of materials and tools used in their relations to industry.

"4. Drawing should be studied in its relation to the work done.

"5. The principles of construction in wood should be taught through observation, illustration, and experience.

"6. At least a few problems should be given which involve invention or design, or both, thereby stimulating individual initiative on the part of the pupil."

Woodwork for Secondary Schools

Four years later, in 1916, Griffith brought out two more books, *Woodwork for Secondary Schools,* and *Carpentry.* With reference to the former, it may be said that it was distinguished, among other features, by the chapter on patternmaking, which many competent teachers considered the best, most concise, and at the same time most adequate treatment of that subject for high school pupils that had appeared up to that time. The book did not aim at complete or extended treatment of any line of high school shopwork, but rather "the elements of subject matter for general experience in several lines of woodwork."

The second of these books, *Carpentry,* was unique in two particulars: (1) included among the profuse illustrations was a series of 40 or more photographs taken at various stages during the construction of the house which Professor Griffith designed and built for his home in Columbia, Mo., during the period of his connection with the University of Missouri; and (2) he advocated the use of trigonometric solutions of plane right triangles in developing the generalized principles of roof framing. Here he obviously drew upon his years of experience as a teacher of mathematics before he became a teacher of industrial arts, as well as upon his years of practical experience as a carpenter and builder. As he explained in the Preface:

"There is absolutely nothing in the use of natural trigonometric functions to prevent their introduction early in the mathematical experience of a boy, except academic tradition. The author has made use of this mathematical tool with upper grammar grade boys with less effort on their part in mastering the principles than was expended in mastering square root.

"The ease with which roof-framing problems lend themselves to solution by the use of natural trigonometric functions, and the readiness with which problems may be generalized thereby, has emboldened the author to make use of it in a text as elementary as this. No previous knowledge of trigonometry is presupposed."

As one of the features of the book on carpentry, I mentioned the series of photographs taken during the construction of the home which Griffith designed and built during his stay at the University of Missouri. In an earlier paragraph, I referred to my visit to the home which he planned and built in Oak Park. To make this part of the record complete I should report that Griffith, with the aid of his father, built the first home for his family in Eureka, Ill., during the year 1900–01. And finally, in 1923–24, he completed a set of plans for a fourth home, and purchased a beautiful lot in the College Hills district, at the University of Wisconsin, Madison, but death came before building operations were begun.

[3] *Correlated Courses,* Preface, pp. 3, 4.

These books were followed shortly by *Woodworking for Beginners*, a much briefer and somewhat simpler treatment of some of the material presented at greater length in *Essentials of Woodwork*. Then came a book of *Projects in Woodwork*, to supply additional instruction material for teachers using the "group method" courses of study.

In 1920, Griffith published his *Teaching Manual and Industrial Arts*. This book was addressed directly to the teacher of industrial arts, and was intended also to be used in the teacher training institution. Its aim was "to assist in the making of the necessary connections between the more general courses in educational psychology and theory of teaching and the special work of practice teaching in manual and industrial arts."

Psychology and Industrial Arts

The importance of making these connections between the general teachings of psychology and the teaching of shopwork and drafting is apparent to everyone who has studied the problems of preparing teachers. Teachers of psychology seldom make the connections clear to their students. They draw their illustrations and examples from the teaching of mathematics, or language, or history, or occasionally science. There is no point in criticizing the psychologists, for very few of them give evidence of firsthand experience in the shop or draftingroom.

It has been left, therefore, to students of industrial arts to make the necessary application of the lessons of psychology and the laws of learning to the teaching of shopwork and drafting. Of these, one of the pioneers, and one of the ablest was Ira S. Griffith. This book, *Teaching Manual and Industrial Arts*, was a milestone in the progress of the movement.

Griffith discusses two methods of procedure in the preparation of teachers: one places the emphasis upon the theory and principles of teaching and generalized information; the other emphasizes the mechanics of teaching, subject matter, and devices. Those who are trained by the first method are slow in attaining efficiency in the art of teaching because they have not been well grounded in techniques. They lack knowledge and experience in the mechanics of teaching. They start out with some grasp of the theory, but must acquire the art.

Those who are trained in the details of subject matter and the mechanics of methods get started on their careers as teachers rather quickly, but too often they fail to show marked professional growth as the years pass, because their training did not give them the ability to see the teaching process as a science.

In Griffith's books, magazine articles, and talks to teachers, he constantly sought to promote a program of preparation that would involve a balance between the theoretical and the practical. He emphasized the importance of the attitudes and ideals of the would-be teacher, and the ambition and striving toward continuous self-improvement, instead of reliance upon a manual of memorized rules and short cuts.

Other Publications

Because of his training and experience in the building trades and contracting, Griffith was in demand as a contributor to two or three trade journals. One of these I remember particularly, *The American Carpenter and Builder*, an illustrated monthly magazine, published in Chicago. I subscribed to this magazine during my term of service at Illinois State Normal University, and I remember the Griffith articles very well. Without any means of verifying my recollection, I should say they extended over a period of four or five years.

Some of these articles were addressed to apprentices and journeyman mechanics, to aid them in understanding the reasons for performing certain operations in certain ways; to explain the mathematical principles back of rule-of-thumb formulas, as in roof framing; to explain and illustrate by means of photographs, drawings, and diagrams the approved techniques in solving problems of construction, as in stair building; and a host of other topics, the discussion of which tended to make the worker better informed and more intelligent in the pursuit of his trade, and proud of his calling.

Other articles were addressed to the foreman, or to the contractor himself, and dealt with topics and problems of entirely different nature. How Griffith managed to find time for the production of all the books and magazine articles of which he was the author is one of those mysteries that will never be cleared up. Education, particularly industrial arts, and the building trades, owe him a debt that will never be paid.

In addition to the books and numerous contributions to professional and trade journals, previously mentioned, Griffith was author of the following books: *Woodworking for Amateur Craftsmen; The Home Furniture Maker and Amateur Craftsman; Roof-Framing Tables for the Steel Square and Protractor; Furniture Making, Advanced Projects in Woodwork.*

Years of Teaching

To return to the chronology of Griffith's career, from which I have been diverted by this discussion of his writings, let me repeat that his first teaching was in graded schools in Greenwood, Neb., and Bloomington, Ill. Then, from 1900 to 1903, he taught mathematics at Eureka College, Eureka, Ill.

From September, 1903, to June, 1912, he was teacher of industrial arts (manual training) in the seventh and eighth grades in the public schools of Oak Park, Ill. The instruction was limited for the most part to woodwork and drawing, with some sheet-metal work, and some other activities on an experimental basis. At the time of my visit to his shop he had no power machinery except a small tool grinder. I believe he later added a bandsaw, a turning lathe, and a small circular saw, but the emphasis in his teaching was on handwork, and the development of ability and self-confidence in the boy, rather than in the production of truck loads of furniture.

In the summer sessions of 1911 and 1912, as I recall, Mr. Bennett brought Griffith to Bradley Institute, Peoria, to assist with the rapidly increasing enrollment, and he remained there during the school year, 1912–13.

He was not permitted to remain in Peoria more than one year, however. During the summer of 1913, Professor Robert W. Selvidge left the University of Missouri, Columbia, to become one of the leading figures in an important period of expansion of George Peabody College for Teachers, Nashville, Tenn., 1913–19. At this juncture, Griffith was called to the University of Missouri, to succeed Professor Selvidge.

I remember some of the circumstances of the nationwide search for a capable successor to Professor Selvidge, made by President Albert Ross Hill, who was president of the University of Missouri from 1908 to 1921. I was a graduate student at Teachers College, Columbia University, New York, when President Hill was in the east on his tour of investigation, during the summer of 1913. I remember two interviews with him at that time, at which he questioned me at some length concerning several candidates on his list.

In the fall of 1919, Griffith was called to the University of Illinois, Urbana, as head of the Department of Industrial Education, but remained here one year only. Parenthetically, after the lapse of one year, Griffith was followed at the University of Illinois by Arthur B. Mays, in September, 1921.

In September, 1920, Griffith was appointed head of the Department of Industrial Education at the University of Wisconsin, Madison, where he remained until his untimely death, at the age of 49 years and ten months, on April 29, 1924.

It is worthy of note that Griffith was still growing as he approached the end of his career. The record shows that his last years of service at the University of Wisconsin were marked by an expanding program of industrial arts and vocational education scarcely to be duplicated elsewhere at that time for comprehensiveness of conception and vigor of intelligent leadership. As expressed in a letter from one of his close associates, "he was always concerned because the bright, intelligent boys in the shops and factories could not have the intellectual and social contacts which the boys on the college campus so often do not appreciate."

In addition to administering a strong four-year curriculum for the preparation of teachers and supervisors of industrial-arts shopwork and drafting, he was directing an extensive program of vocational education in trades and industries. The latter included courses in job analysis, industrial management, foreman training, apprenticeship, and other subjects. One of the significant projects engaging his attention was a study of methods and procedures for giving to senior high school boys some practical insight into the management and leadership problems of the men occupying the minor executive positions in industry.

Vocational Education and Society

THOMAS DIAMOND
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(Continued from page 51 of the February, 1948, issue)

Is It Good Policy?

Much of the work of the director involves personal contact with people. Certain responsibilities necessitate working with teachers, others call for conferences with other administrators and supervisory officers in the school system and still others call for making contact with individuals and organizations outside of the school.

Because of the existence of this human factor in his activities the director must be careful to avoid making statements which might offend those with whom he has to deal. Occasions arise in which a person may be in possession of certain facts but it is not always discreet to mention them. We find things being done and said everywhere because it is polite to do them or to say them. In state and national politics we find appointments being made because they are acceptable to certain party leaders. Again, we find political representatives supporting bills they know little about because of their desire to get in return support for a bill of their own. In other words, political action occasionally is dictated by expediency.

Then, too, if a man were perfectly frank about his wife's hat it might lead him into trouble. And when one wishes to comfort someone who is in trouble it is customary to think more of helping a friend than of the truthfulness of what one says. A person may believe his employer is dishonest but it would scarcely be expedient for him to tell him so. So it appears that everywhere in our lives we find things being done because it is expedient or because it is good policy.

Because of this it should be of value to consider how this fact affects the director of vocational education.

1. When the director visits a school it is courteous and it is always good policy to call on the principal before visiting the teachers. Even though the principal is not in his office when the director calls he will learn when he returns that the director made an effort to call on him.

It makes for better relations if the director keeps the principal informed concerning the purpose of his visits.

Some directors follow the practice of hanging their hats and coats in the principal's office as they enter the building.

2. It is good policy to discuss with the principal any changes contemplated in school shops.

3. The director should see to it that the principal has a course of study covering each shop activity. If this is done the principal will be in a position to talk intelligently about what is being done. This is likely to assure his co-operation in any proposal made by the director.

4. If there is a department head in charge of any activity the director should not fail to recognize him when orders have to be issued. He should be consulted on any matters pertaining to the work or the teachers under his direction.

The desirability of this becomes apparent to the director when he considers the possibility of the superintendent ignoring the director and taking up matters pertaining to the department directly with the teacher.

5. It is always good policy to assume the attitude that your predecessor knows his business. It pays to postpone judgment on what you find in a department you are just entering until you have had an opportunity to study the reasons for conditions being as they are. Things you consider objectionable may have been beyond his control, and they may be beyond yours.

If you find that changes must be made they should be made slowly. The director who can change procedures in his department without disturbing the personnel, or making them conscious that a revolution is going on, is likely to be successful. Changes made as a result of convincing the teachers will cause less disturbance than if they are made by edict.

6. Always assume that the shop teacher knows his special field better than you do. This may not be literally true but it is always good policy to give the other chap credit for knowing his job as well as you think you know your own.

7. It is good policy to do business in writing. While this is not always possible, the director should carry it as far as conditions permit.

Superintendents, principals, and even directors are forgetful. In view of this the following suggestions seem worthy of consideration:

a) Send your suggestions to the superintendent or principal *in writing.*

b) Confirm your conversation concerning departmental matters in writing. When you discuss a departmental problem with another school official it is always possible for each of you to interpret the conversation differently. When you state your point of view in *writing* it gives the other person an opportunity to take any action necessary to harmonize his thinking with yours.

c) Orders, changes, policies should all be sent to the teachers *in writing.*

d) When changes have to be made in-

volving the safety of pupils even though you have suggested these changes orally — always follow up with a formal request *in writing*. Your carbon copy may be a means of saving you embarrassment after an accident occurs.

8. It is good policy to attend professional conventions, because:

a) You get to know people and be known.

b) You have an opportunity to exchange ideas with others in your field.

c) You have an opportunity to broaden your point of view through hearing what people in other fields are doing.

d) All of these tend to raise your professional standing.

9. It is good policy to write for your professional magazines, for the same reasons just stated. In addition one should consider the satisfaction that results from having expressed your ideas in writing so that other people may share them. In this connection a person should not be deterred from this activity merely because he finds difficulty in writing. What magazine editors want are ideas. If these ideas are expressed well so much the better. However, if they get an idea, however poorly expressed, they will soon make it acceptable from a literary point of view.

10. It is good policy to leave your personal feelings outside the school. You may dislike a fellow worker most heartily, personally, but it is a mistake to permit this to hinder co-operative action within the school organization. If you must hate him, do it outside.

11. It is good policy to visit other schools and departments as often as it is convenient. Every teacher has something that is worth observing. When you find an idea that is good do not hesitate to copy it. After all, there is little real originality in the world — use the good that you find — wherever you find it and take heed that you avoid the things that are bad.

12. It is good policy to be neat in your appearance, and that your clothing be appropriate for your work. The director is dealing with people and people are influenced by one's appearance. This may be the deciding factor in influencing the reaction of those with whom you come in contact. It pays to spend ten minutes each day in shaving. Even at fifteen cents, a shoeshine is a good investment. These seem small matters but they may loom up big when the opinion of people will influence the work of a director.

13. Smoking is not frowned upon by society in general. However, there are those to whom the odor of tobacco is objectionable. If the director must smoke it is good policy to do so in his home or club. He should be particularly careful to avoid carrying the odor into the school. There is no suggestion here of underhandedness, it is just a matter of good taste. One does not wear his hat in church, nor does he wear his overshoes in the parlor. He refrains from certain practices, not because they are wrong, but merely because they are not appropriate in certain situations.

14. What has been said about tobacco may be said about the consumption of liquor. There is nothing in the rule book which prevents a director from drinking beer. However, while no one likes a secret drinker, it is good policy for a director to use discretion when he feels he must drink.

15. The director should be an example to his teachers as well as to the pupils. Because of this it is good policy for him to attend church. One need not be hypocritical about this. Particularly in smaller cities people tend to have greater respect for the man who attends church. Therefore, it becomes a matter of business — good business.

16. The director who has the reputation of not paying his bills is likely to lack the respect of his community. A good citizen meets his responsibilities, therefore, it is good policy for the director to pay his bills when due. If he fails in this, he is classed as a *deadbeat* and loses the respect he must have if he is to be effective in his work.

17. It is good policy for the director to use good English. It is true he may be dealing with shop activities, but this does not justify using some types of shop language. He is dealing with supervisory and administrative officers in the school system and they tend to judge his work by the manner in which he expresses himself. Furthermore, there are others in the school system who are attempting to teach English and they have a right to expect co-operation from school officials.

18. It is good policy for the director to keep himself up to date on matters pertaining to his field. If he is to lead his teachers he must be familiar with the latest procedures, methods, or ideas in his field. To the extent that he knows, to that extent can he depend upon the respect of his teachers.

19. The director is in a position where he must meet people in other fields of education. If he is to win and keep their respect he must inform himself with some of the outstanding features of their work. It is not essential that he know these fields intimately. It is desirable, however, that he be able to converse with them intelligently about their special fields. This is a good policy to be able to talk intelligently about recent happenings in other fields of education.

20. Not only is it a good policy but it should be an absolute rule that the director be loyal to his supervisors. There are so many ways in which disloyalty may manifest itself that the director must weigh each act, and each statement he makes in the light of the interpretation others may place on it. He owes to the administration the same loyalty that he has a right to expect from the teachers who are under his charge.

A post-summer session class in art metal, State Teachers College, California, Pa. Miss Rose A. Leacock, arts co-ordinator, and A. J. Hoover, instructor. Submitted by Dr. S. L. Coover

Industrial Arts and Vocational Education

John J. Metz, Editor

ADULT EDUCATION

Adult education has progressed greatly in the past decade. It has not advanced as far as it can, however, and greater opportunities ought to be opened to adults who might profit by the *back to school* movement.

Vocational and adult education can proudly point to many fine things that have been accomplished by the adult education movement, yet educators can still do more if they take a leaf out of the many experiences which industrial arts and vocational education have amassed since those educational fields have been added to the American educational system.

Many adults have changed from one occupation to another, just because a vocational school gave them an opportunity to learn facts and acquire skills needed for the change. Many adults, too, have availed themselves of the opportunity to engage in hobby work offered in afterschool hours by some schools.

Such hobby opportunities, unfortunately, are not usually available in nonshop subjects, and many adults are not interested in doing shopwork. Some of these men and women could be attracted to other subjects from which they could gain much pleasure and profit.

The writer knew an elderly cabinetmaker who had never enjoyed any advanced educational facilities, yet he was quite an authority on German and early American history. No doubt there are many like him, only they do not know how to get started. There are others who need a little help in acquiring better reading habits. If an opportunity were given them they, no doubt, would derive a great deal of pleasure from their belated academic training.

It is understandable, of course, that this type of hobby education cannot be of the heavy, straight, high school type of history and literature. These courses must rather be made as popular and attractive as possible to get these people to make the preliminary effort to attend.

It might be asked at this time, "Are courses of this kind adult education?" "Are they worth the money that must be spent to set them in motion?" "Can't people who want to read literature and history go to the public library?"

These questions can be answered by asking more questions. "Why are the school shops in some cities opened at night to adults who enjoy doing shopwork?" "Isn't a hobby a wonderful stabilizer for preserving mental health?" "Couldn't some of these more or less academic offerings be adapted to the method used in the general shop, and would they cost any more to operate?" This would permit those who want to study literature, history, poetry, or the drama, to get a satisfying smattering of their favorite subject under the guidance of a teacher, without taking the extended courses required for high school credits.

Probably the methods developed in our industrial-arts hobby and craft classes may help the academic classes develop nonshop hobby courses to make many people happy who are now vainly looking for something that will satisfy their longings.

THE LOWLY BOLT AND NUT

Most shop students are very much interested in information about who invented the things which they use in making their projects. The nuts and bolts which have become a very commonly used fastener, however, usually are taken for granted. It is interesting, therefore, to learn that as late as 1839 bolts and nuts were still made by hand in the blacksmith shops of our country, and that accordingly, they were quite expensive.

In that year, however, Micah Rugg, a blacksmith of Marion, Conn., devised a bolt heading machine which helped him produce the bolts faster than it was possible to make them by hand. Several years later he also perfected a threading machine, so that before long he could produce 500 nuts and bolts in a day.

Naturally, his crude machinery would not compare with the highly accurate automatic machinery used for producing the bolts and nuts needed today by our highly mechanized industrial civilization. At the time when he perfected his machines to fashion bolts and nuts only a few kinds and sizes of these fasteners were made. During World War II, 200 million bolts of many shapes and sizes were produced.

For his day, however, Micah Rugg's production was so outstanding that both he and his product were maligned by the other blacksmiths, and he had trouble to convince his purchasers that he was really offering them a product that was much better than any that they could obtain elsewhere.

Nuts in Micah Rugg's day, before the invention of his machines, were made by hand on an anvil. A piece of heated square bar was cut off, dropped into a shallow recess and then the proper sized punch was driven through its center. The thread was cut with a hand tap. Today these nuts are punched out of flat bar stock and are threaded on automatic machinery in great quantities.

It is interesting also to know that in the early days of bolt making the metal out of which they were made could be obtained in the form of bar stock only, while now many forms of screws, bolts, and nuts can be made of rods and wire.

It is equally interesting that the number of items that are produced have increased enormously since Rugg made his first bolt heading machine. At present approximately 400,000 items in the line of bolts and nuts are produced which can be regularly obtained on the market.

Information, such as the foregoing, may not be absolutely necessary in industrial arts and vocational education courses, but it adds interest to the work and takes but a few more moments of presentation time when added to a regular related information lesson, or when demonstrating the making of a project or a lesson on bolts and nuts.

The information given in the foregoing was abstracted from a historical sketch appearing in the December, 1947, issue of *Steel Facts*.

SUMMER SCHOOL

The mid-point of the second semester of the school year has almost been reached. Spring is approaching, and with spring comes that longing for vacation time. Summer school, of course, also enters the picture, and choosing the educational institution for the summer of 1948, may well be considered now.

The advertising pages of this issue can help you make the right decision. Better look them over.

Problems in Supervision and How to Meet Them

WALTER B. JONES
Consultant in Teacher Education
Rio de Janeiro, Brazil
On leave from the University of Pennsylvania

(Continued from page 53 of the February, 1948, issue)

The Supervisor Bares His Difficulties

What procedures do you follow as a supervisor in training the new instructor on the job?

"Breaking in of new instructors in the war production training classes involves a number of problems such as: (*a*) learning how to present a lesson; (*b*) learning how to make and keep records; (*c*) learning how to make up a requisition; (*d*) learning how to take care of small tools; (*e*) learning how to take care of equipment; (*f*) learning how to meet new teachers; (*g*) learning how to meet the employer.

"We get instructors to make thorough preparation for presenting the subject. We ask them to prepare outlines of lesson plans and organize demonstration equipment in advance of presentation. Instructors have fewer hours to prepare lessons on account of night classes. They are not familiar with lesson plans."

Lack Co-operation on Part of Management

How do you develop wholehearted co-operation on the part of plant management in recognizing training needs?

"Lack of wholehearted co-operation on the part of management in recognizing training needs is another problem. Though indirectly related to supervisory shop teachers, it enters predominantly into the supervisors' responsibilities for this program. The reason for the lack of wholehearted interest during the war* period was attributed to the fact that every local war industry was taxed beyond all reasonable limits to meet production demands that have been placed on them by the army and the navy; therefore, their prime concern must necessarily be production without having time, in many instances, to determine how production could be more effectively carried out. The cost-plus element also entered into this picture, because the teacher-foreman contacts and advisory committee meetings went a long way toward modifying this problem."

*It must be remembered that some of these answers were collected during the war production era.

Securing Critical Materials

How do you meet the difficulty of obtaining supplies of critical materials?

"Some of these materials could not be obtained during the war years, and cannot even be obtained now, and others only in greatly reduced quantities. This necessitates shifting materials from a shop having an immediate excess to shops where such materials are badly needed. Steel is one of these items and a number of such transfers are being made. Another critical item is soldering coppers. Since these cannot be bought in large quantities, we are now casting them in our foundry from scrap copper wire."

Lacks Time for Supervision Owing to Paper Work

How can time for supervision be found when much of supervisory time must be devoted to clerical work?

"The supervisory duties which I find most difficult to perform are 'supervisory duties.' This is a situation not peculiar to wartime but it is aggravated by the additional reports, surveys, inventories, questionnaires, checks and double checks demanded by the agencies and individuals who evidently think that they must amass reams of information or misinformation in order to further the war effort. It certainly furthers the effort, if not the war."

"Lack of clerical assistance in my case makes it necessary to compile this material by my own efforts and to fill in these reports, surveys, in my own fair hand. As a result ordinary necessary supervision must go hang. As to how I perform my duties now, it must be admitted that if by duties is meant supervisory duties, I don't. Most of these duties must be performed by brief but frequent conferences with teachers when they can be caught for a few minutes."

"If it were possible to devote a reasonable amount of time to real supervision, war conditions would not greatly interfere. Additional paper work is the worst handicap. The solution is clerical assistance. An added difficulty is that the pressure of additional work on teachers due to the war situation makes it desirable that they should have more supervision and help. On the contrary they get less."

The same point of view is taken with respect to the teacher and clerical work.

"Why should a teacher — an expert in a given field — be required to spend valuable time doing clerical work? Proper supervision should include adequate clerical assistance so that the teacher may use all of his time to teach."

The Director and the Supervisor

Typical responses from directors, some of whom supervise, are presented in the following.

Supervisor Lacks Qualifications for Success

Supervisors are criticized because they lack training for their jobs. Is this criticism justified? If so, what should be done about it?

"The supervisor visits the shops and looks things over in general without doing any constructive work with either the pupils or the teachers. He should be able to observe the progress of the pupils, encourage them and keep track of their records so that when their training is completed, he has a definite knowledge of their ability for placement in industry."

Getting Qualified Teachers

From what sources have most of your prospective instructors been recruited?

"The problem of securing a sufficient number of qualified teachers to replace instructors who either have been inducted into the armed forces or have requested leaves of absence for the purpose of accepting positions of a technical or supervisory nature in the war production industries is important. This has not been quite as much of a problem in the senior high schools and the trade school as it has been in the industrial-arts program in the junior high school."

"Junior high school men are younger and having fewer responsibilities, have been inducted into the service in greater numbers. Our program is still functioning in both these fields but we have had some

considerable difficulty in recruiting qualified personnel."

Training Courses for Supervisors Needed

What responsibilities for training subordinates have you assumed? How do you proceed to train them? Could part of this task be delegated to teacher training agencies?

"The shortage of competent men to supervise these trade and industrial courses is a real problem. Training courses for supervisors should be kept going constantly."

Keeping Teachers Professionally Alive

How do you help instructors keep abreast of changing methods in their trades?

"I am very much concerned as to how to keep shop teachers from becoming routinized. Apparently the easiest method for most teachers is to organize a course and then follow it religiously after the fashion of other school instructors. It becomes increasingly difficult for them to attend meetings or meet other professional requirements. I will admit that those who are working on the defense training program are getting a new picture of school activities which is very helpful."

"Subscribing for magazines specializing in changing industrial practice."

"Obtaining reference books on industrial developments."

"Working in industry during vacation periods and extra shifts after school."

"Interchange of new developments among instructors in informal meetings."

"Free publications on trade information distributed to teachers."

"Assign as many instructors as possible to do co-ordination work and bring information back to school."

"Supervisor sets example on high professional basis such as taking teacher training work, attending conferences, reading and discussing up-to-date literature."

Need for Job Analysis as Basis for Course of Instruction

Have you found it feasible to survey the pay-roll jobs for which trainees are being prepared to find most frequently occurring tasks? If so, what have you done? Have any surveys of industrial education needs, extensive or limited in scope, been made?

"At the present time, we do not have an outline of the specific duties required for each job. Any analysis of these duties, worked out by the teachers and the foremen of industries and shipyards would give us a specific basis for our courses of study. This has been worked out for the electric arc welding course so that the teachers of these courses know just what will be required by the foremen. This particular course has been so successful that five different shipyards in this locality have requested us to send all of our trainees to them.

"I think much of the success of this course is due to the teacher's understanding of the definite training needs. A group meeting of the foremen, teachers of the jobs for which training is being offered, and directors, could outline the job responsibilities in a short time. This would also get the foremen and training personnel acquainted and help in the appreciation of each other's work."

"The supervisor should assist the instructor or provide him with necessary authority, material and funds for making a job survey of his particular trade; that is, to find out which jobs or operations, in a particular trade, are in the greatest demand in industry, so that these may make up the greater part of the course of study.

"Case: Oftentimes a student is placed on a job and later comes back with the remark that he is not doing the jobs that he was trained for. Other students holding jobs may be doing just the jobs that they were trained for in this course. This situation makes it rather difficult for the instructor to determine what to teach. Since this course lasts over 12 weeks, it is impossible to teach the whole trade."

"If I were the supervisor, I would assist the instructor in making such a survey by providing the necessary authority, material, and funds. The instructor could then make a survey of his trade in this particular locality, covering jobs done over a period of a year, and then breaking this down to jobs done during the different seasons. This would give the instructor information as to which jobs should be taught in this locality during a certain season so that the student may utilize his training to the utmost. Only by teaching the jobs that occur most frequently in industry can this be accomplished."

Getting Supervisors to Aid in Improving Course Material

Where satisfactory instructional materials are not available what methods have you used for their organization and preparation?

"The problem which gives us the greatest trouble is getting the supervisors to assume sufficient responsibility in connection with improving course material for each shop under his supervision."

"Constant changes are taking place in industry which in turn require changes in instructional material and the supervisor should see that the instructor keeps in constant contact with his trade and improve his course material accordingly. The supervisor needs to stimulate the interest of his instructors in preparing new instructional material and also assist the instructor in preparing this material."

"It is my opinion that instructors should work a certain period of time in their trade — at least every three years — and in this manner they will be able to keep abreast of changing methods which develop in their trades."

"I also believe that conferences should be held at regular periods, between supervisors and instructors, with the purpose of drafting new course material."

"One task that many teachers have difficulty in doing is to prepare good teaching materials. They are able to display and use to good advantage the charts and teaching aids that come direct from large companies, such as the saw and file, drill and carborundum companies, but a good many of them rarely ever develop anything of their own."

"Probably the best way to obtain results in this situation is to have in-service classes or meetings where they actually participate in preparing such materials for themselves. This is true of sample boards, visual aids, and all kinds of teaching devices."

Stimulating Teachers to Prepare Course Material

If you consider it necessary, how do you motivate teachers to prepare (*a*) an outline of instruction, (*b*) lesson plans, or (*c*) instruction sheets?

"I ask supervisors to have all teachers keep up with courses of study and planned teaching material — planning on paper, which is necessary. Results are too often unsatisfactory especially in case of teachers directly from the trade.

"Case: A teacher of radio is recognized as the best informed technician in radio and sound equipment within the area. However, in spite of considerable personal work, little was accomplished in the way of written plans. In response to demand, a brief outline was produced, but it was not followed as a course of study."

"The only answer the local director can suggest is an adequate background of teacher training before starting the job. Classroom habits are formed on the job whereby the teachers get by without proper planning, and so do not respond to in-service training."

Preparing Records and Reports

How do you plan so that instructors use proper forms and prepare their reports to meet the date deadline?

"Principals do not seem to appreciate the importance of a date deadline. We check and recheck to get reports."

"The most difficult problems confronting me, both as a supervisor and director are poor presentation, poor daily planning (poor houseKeeping frequently accompanies this), and poor record keeping. These, I believe, are the natural results of employing mechanics direct from industry without any professional training. The following are typical situations:

"Mr. 'X' presents too many ideas at one time. (This is characteristic of practically all instructors who have not had professional training.) The only thing I have been able to do and probably all I can do in regard to this situation is by repeated suggestions and conferences and follow-up.

"Mr. 'Y' evidently never thought of planning his daily work in advance. Here again I make suggestions, check his plans, and follow up.

"Mr. 'Z,' until after a considerable number of suggestions, failed to keep accurate daily records of the progress of the students in addition to attendance records.

"From previous experience I am confident that if we could have prospective teachers for two or three days' conference before they actually take over teaching, most of these problems and difficulties could be very much lessened."

(To be continued)

Teaching Materials for Industrial Education

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(Continued from page 22 of the January, 1948, issue)

BULLETINS AND BOOKLETS

Woods

Adjustable Clamp Co., 417 North Ashland Ave., Chicago 22, Ill.
Catalog No. 17 — Clamps

American Forestry Association, 919 — 17th St., N.W., Washington 6, D. C.
Trees Every Boy and Girl Should Know — 50 cents
Knowing Your Trees — $2.50
American Conservation — $2.50

Appalachian Hardwood Manufacturers, Inc., 414 Walnut St., Cincinnati, Ohio
Appalachian Hardwoods — single copies free

E. C. Atkins and Co., 402 So. Illinois St., Indianapolis 9, Ind.
Saw Sense
Guide to Metal Cutting Efficiency
Directions for Fitting Narrow Band and Small Circular Saws

Behr-Manning Corp., Division of Norton Co., Troy, N. Y.
Coated Abrasives in the Plastics Industry (supplement to a lecture course on coated abrasives)
Sandpaper — Its How and Why
How to Sharpen
Shop Projects (sets of eight shop projects on abrasives, covering coated abrasives, oilstones, manufacturing, selection, and application)

Brodhead-Garret Co., 4560 East 71st St., Cleveland 5, Ohio
Brodhead-Garret Company Catalog, 1946–1947

California Redwood Association, 405 Montgomery St., San Francisco 4, Calif.
California Redwood — Its Properties and Uses

The Carborundum Co., P. O. Box 337, Niagara Falls, N. Y.
The Abrasive Tools of Industry
What a Griding Wheel Does
Standard Grinding Wheel Shapes
The Grinding Wheel as a Production Tool
Classes of Grinding Operations
Wheel, Work and Machine Movements—I
Wheel, Work and Machine Movements—II, III
Stresses Due to Wheel, Work and Machine Movements
Stresses Due to Contact Between Wheel and Work
The Disposal of Chips
Grinding Wheel Safety
Wheel Balancing
Dressing and Truing Tools
Dressing and Truing Procedures
Wheel Marking Symbols
Center Type Cylindrical Grinding — I, II
Centerless Type Cylindrical Grinding — II
Surface Grinding
Internal Grinding
Cutting Off
Snagging and Off-Hand Grinding
Causes and Corrections of Common Grinding Errors
Coated Abrasives
Polishing Grains

Casein Company of America, 350 Madison Ave., New York 17, N. Y.
Casco Gluing Guide
Adhesives That S-T-R-E-T-C-H
Save Time, Paint and Labor
Natural and Synthetic Products for Gluing
Casco Flexible Cement for Pasting, Cementing, and Gluing
Modern Wood Gluing with Cascamite Urea-Resin Glue
Powdered Cold Water Mix Casein Glue
Cascophen New Resin Glue of Utmost Durability

Cincinnati Tool Co., Norwood, Cincinnati 12, Ohio
General Catalog No. 39-E

Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland 14, Ohio
Handbook for Drillers

Clover Manufacturing Co., Norwalk, Conn.
Handbook, Coated Abrasives
Coolants for Abrasive Belts, Bulletin No. 1
Testing Coated Abrasives, Bulletin No. 3
Belt Sanding of Metal, the Polishing Lathe, Bulletin No. 4
The Effect of Moisture on the Work Value of Glue-Bonded Coated Abrasives, Bulletin No. 5
Abrasive Disc Sanders . . . A Study . . . Method of Finishing Open-End Wrenches on the Polishing Lathe, Bulletin No. 6
Post-War Catalog (containing entire section of technical information on coated abrasives)

Columbian Vise and Mfg. Co., 9021 Bessemer Ave., Cleveland 4, Ohio
Catalog No. 47, Columbian Vises

Albert Constantine, Jr., 797 E. 135th St., New York 54, N. Y.
Master Manual of Woods — 25 cents

Delta File Works, 4837 James St., Philadelphia 37, Pa.
Files, How to Select, Use, and Conserve Them
Catalog No. 47, *Delta Files "Hand Files"*
Catalog — *Delta Rotary Files*

Delta Mfg. Co., 602–634 East Vienna St., Milwaukee 1, Wis.
The Deltagram (6 issues) *Homecrafter's* magazine — 75 cents
21 Lovely Lamps — 10 cents
19 Charming Chairs — 15 cents

One Evening Projects — 10 cents
Garden Furniture and Novelties — 10 cents
40 Fine Tables — 25 cents
Furniture Designs — 25 cents
Toys, Games, Playground Equipment — 10 cents
Small Furniture Designs — 20 cents
Practical Delta Projects, Books 2–11 — 10 cents each
How to Get the Most Out of Your Farm Workshop — 25 cents
Practical Finishing Methods — 50 cents
Making Money with Delta Tools — 10 cents
How to Plan a Home Workshop — 25 cents
Plan for Eleven Foot Utility Boat — $1
Delta Easy-to-Work-With Furniture Blueprints, No. 50–67 — 5 cents each
Delta Patterns and Plans for More Fun in Your Homecraft Shop — 5 cents each
Index of Deltacraft Publications — 25 cents
Operating Manuals:
Getting the Most Out of Your Lathe — 25 cents
Getting the Most Out of Your Drill Press — 25 cents
Getting the Most Out of Your Circular Saw and Jointer — 25 cents
Getting the Most Out of Your Shaper — 25 cents
Getting the Most Out of Your Abrasive Tools — 25 cents
Getting the Most Out of Your Band Saw and Scroll Saw — 25 cents

Donley Brothers Co., 13900 Miles Ave., Cleveland 5, Ohio
Successful Fireplaces — How to Build Them — 50 cents

Fisher Body Craftsman's Guild, General Motors Corp., Detroit 2, Mich.
Details and Instructions for Designing and Making a Model Automobile — 1948 (available for teachers)
Your Boy and His Future

Foley Mfg. Co., 3300 N.E. Fifth St., Minneapolis 18, Minn.
Foley Automatic Saw Filer
No. 462 Vulkan Electric Brazer
Acme Circular Sharpener and Gummer
Foley Saw Setters
(above folders available to teachers in limited quantities)

General Finishes Sales and Service Co., 1548 W. Bruce St., Milwaukee, Wis.
The Story of Modern Penetrating Finishes
Work Sheets on Refinishing

Hartford Clamp Co., Inc., East Hartford 8, Conn.
Catalog No. 41

Haskelite Mfg. Corp., Grand Rapids 2, Mich.
Pamphlets on Plywood and Plymetal Products

Heller Brothers Co., 865 Mt. Prospect Ave., Newark 4, N. J.
Nucut Files — 100 Years of Experience (1936 publication, 100 Year Anniversary Catalog, extra size)
F-45 File Catalog
T-44 Tool Catalog
Rotary File Catalog

Louden Machinery Co., Fairfield, Iowa
Loulen Barn Plan Book

National Paint, Varnish and Lacquer Assos., Inc., 1500 Rhode Island Ave., N.W., Washington 5, D. C.
Paint at War
Varnish and the Queen
The Paint Story
The Genie's Map
Chu Chang to Paint With
Tales of the Genie of the Paint Pot
Notes on Colonial American Decoration
Oil is the Tie that Binds
Rainbow and the River
The Fascinating Story of Pigments
When Our Country Was a Pup
Lacquer's Like That
Sidelights on Stains
The Economics of Paint
"Save the Surface" pamphlets
Paint Power — and How to Sell It — $4.50
Paint Power — and How to Teach It — 50 cents

Nicholson File Co., Providence 1, R. I.
Nicholson Takes You Behind the Scenes
How's Your Vocabulary on Files?
Some Hints on Files and Filing
Marks of a Good-Poor Mechanic
King Saul Knew About Files
Saw Filing, Too, is an "Art"

Ohlen-Bishop Co., Columbus, Ohio
Saw Efficiency

Pittsburgh Plate Glass Co., 632 Duquesne Way, Pittsburgh 22, Pa.
Color Dynamics for Buildings
Pittsburgh Color Dynamics for the Home
Pittsburgh Color Dynamics — The Scientific Utilization of the Energy in Color to Promote Efficiency in Industry

Fayette R. Plumb, Inc., 4837 James St., Philadelphia 37, Pa.
Axe Manual — 10 cents
Plumb Hammers, Hatchets, Sledges, Axes, Files

Porter-Cable Machine Co., Syracuse 8, N. Y.
General Catalog
BG-8 Wet Belt Grinder
L-4 Centerless Grinder
C-6 Belt Grinder

Rogers Isinglass and Glue Co., Gloucester, Mass.
Rogers Book of Woodworking Shop Notes

Sears, Roebuck and Co., Consumer Education Division, 925 E. Homan Ave., Chicago 7, Ill.
Hidden Values: Better Lighting

Table Appointments	*Slip*
Bedding	*Hosiery*
Home Furnishings	*Children's Clothing*
How to Buy Shoes	*Cooking Utensils*
Fabrics	*Freezer*
Foundation Garment	

Simonds Abrasive Co., Tacony and Fraley Sts., Philadelphia 37, Pa.
Simonds Abrasive Company Mounted Wheels and Mounted Points
Grinding Wheel Data Book

Southern Pine Association, Canal Bldg., New Orleans, La.
Livable Homes of Southern Pine — 25 cents
Low Cost Homes — 15 cents
Your Home — 25 cents
Beautifying the Home Grounds — 15 cents
9 Popular Garage Plans — 25 cents
How to Build Southern Pine Barns and Implement Sheds — 25 cents
How to Build Southern Pine Smaller Farm Structures — 15 cents
Better Farm Buildings with Pre-Cut Southern Pine — 5 cents
Southern Pine Manual, Standard Wood Construction — $1
The Way to Build the House to Last
Lumber and Millwork
Southern Pine Heavy Duty Flooring and Roof Decking
How to Have Beautiful Durable-Economical Southern Pine Floors

Stanley Tools, New Britain, Conn.
The Joy of Accomplishment
Expert Soldering
Tool Catalog 34
Steel Square Booklet
Electric Tool Catalog
Router-Shaper Catalog
"Yankee" Tool Book
How to Care For and Sharpen Auger Bits by Jennings
How to Work with Tools and Wood — $1
Stanley Plan Sets (5 plans in each set) — 10 cents per set

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Set No.	19	*Household Articles*

95 Project Plans in Binder — $2
Tool Guide — 25 cents
Plan Book — 10 cents

Tile-Tex Company, 1232 McKinley Ave., Chicago Heights, Ill.
Floors That Endure by Tile-Tex — 10 cents

United States Department of Agriculture, Forest Service, Washington 25, D. C.
Selection of Lumber for Farm and Home Building, F-1756
Farm Buildings from Home Grown Timber, F-1975
Careers in Forestry, MP-249
Our Forests, What They Are and What They Mean to Us, MP-162
The Work of the U. S. Forest Service, MP-162
Use and Abuse of Wood in House Construction, MP-358

Living and Forest Lands, MP-388 (contains teaching units)
Forestry for 4-H Clubs, MP-395
Some Plain Facts About the Forests, MP-543
Building With Logs, MP-579
Let's Talk About Timber Supplies, DS-26 (discussion guide)
Don't Kill the Forest Goose!, AIS-13
Great Forest Fires of America, G-1
National Forest Vacations, G-5
American Wood Series: Leaflets on: *Alder,* red — *Ash* — *Aspen* — *Baldcypress* — *Basswood* — *Beech* — *Birch* — *Buckeye* — *Butternut* — *Cedar,* Alaska — *Cedar,* Atlantic White — *Cedar,* California Incense — *Cedar,* eastern red — *Cedar,* northern white — *Cedar,* Port Orford — *Cedar,* western red — *Cherry,* black — *Chestnut* — *Cottonwood* — *Dogwood* — *Elm* — *Fir,* balsam — *Fir,* Douglas — *Fir,* noble — *Fir,* white and grand — *Hackberry* — *Hemlock,* eastern — *Hemlock,* western — *Hickory* — *Holly,* American — *Larch,* western — *Locust,* black — *Magnolia* — *Maple* — *Oak* — *Osage* — *Orange* — *Pecan* — *Persimmon* — *Pine,* eastern white — *Pine,* jack — *Pine,* lodgepole — *Pine,* ponderosa — *Pine,* red — *Pine,* southern — *Pine,* sugar — *Pine,* western white — *Poplar,* balsam — *Redwood* — *Spruce,* eastern — *Spruce,* Englemann — *Spruce,* Sitka — *Sycamore* — *Sweetgum* — *Tamarack* — *Tupelo* — *Walnut,* black — *Willow,* black — *Yellow Poplar.*
All Aboard the Forestry Special, K-1 (playlet suitable for children)
Camping Hints in the National Forests, K-2
Care of Trees — How to Revive Feeble or Weak Trees, K-3
Delivering Forest Fire Fighters by Air, K-5
Edible Fruits of Forest Trees, K-6
Forests of Alaska, K-8
Forest Service Summer Home Policy, K-10
Highlights in the History of Forest Conservation, K-12
Logging and the Production of Lumber, K-15
Making Paper From Trees, K-16
Parachute Method of Fire Suppression, K-18
State Trees, List of, K-19
Use of Aircraft in Forestry, K-24
Uncle Billy's Speech, K-25
Why Leaves Change Their Color, K-26
Wood — the Material of a Thousand Uses, K-27
Community Forests — A Practical Step in Post-War Planning, O-1
How to Make Charcoal on the Farm, O-4
List of State Foresters, O-10
Schools giving Courses Leading to a Degree in Forestry, O–10
Alaska, Its Forests and Forest Industries, O-12
Tree Description Sheets: Available for *Eastern White Pine, Western White Pine, Longleaf Pine, Sugar Pine, Shortleaf Pine, Ponderosa Pine, Alpine Fir, Red Spruce, Redwood, Sitka Spruce, Eastern Hemlock, Western Hemlock, Douglas Fir, Eastern Redcedar, Western Redcedar, Baldcypress, Black Walnut, Yellow Birch, American Beech, Sugar Maple, American Basswood, Black Locust, Yellow Poplar, Sweetgum, Giant Sequoia, White Ash, American Elm, White Oak.*
Bulletins and Booklets (printed)
Arbor Day, Its Purpose and Observance, F-1492
Water and Our Forests, M-600
Cooking Over the Campfire, O-3
Bulletins and Booklets (processed)
What to Do When Lost in the Woods, O-23
How Our Forests Serve Us, O-24
Enemies of the Forest, O-25
Forests of the Future, O-26
Forests and Wildlife, O-27
Forests and Water, O-28
Folks, Meet Smokey Bear (radio script), O-29

United States Department of Agriculture, Forest Service, Madison 5, Wis.
Publication List No. R704 on Wood Preservation, includes:
Technical notes:
**Weathering and Decay,* 221
**Prevention and Control of Decay in Dwellings,* 251
**Effect of Time of Cutting Timber on Its Durability,* F-15
**Comparative Durability of Green and Seasoned Timber,* F-33
**Blight-Infected Chestnut as Durable as Sound Chestnut,* 174
**Comparative Value of Timber Cut from Live and Dead Tree,* 101
**Difference Between Heartwood and Sapwood,* 189
**Comparative Decay Resistance of Heartwood of Different Species When Used Under Conditions That Favor Decay,* 229
**Fire-Retardant Paints Containing Borax,* 249
**Treating Spruce and Balsam Fir Christmas Trees to Reduce Fire Hazard,* 250
***Wood Preservatives,* R-149
***Testing Wood Preservatives,* R-1190
**Determining Penetration of Wood Preservatives,* 163
**Properties of a Good Wood Preservative,* 177
****Wood Handbook* — 50 cents (obtainable only from Superintendent of Documents, Washington 25, D. C.)
****Manual on Preservative Treatment of Wood by Pressure* — 15 cents (obtainable only from Superintendent of Documents, Washington 25, D. C.)
****Relative Resistance of Various Hardwoods to Injection With Creosote,* by C. H. Teesdale and J. D. MacLean, U. S. Dept. Agr. Bul. 606 — 1918.
****Tests of the Absorption and Penetration of Coal Tar and Creosote in Longleaf Pine,* by C. H. Teesdale and J. D. MacLean, U. S. Dept. Agr. Bul. 607 — 1918
**Government Publications of General Interest on Wood and Trees,* D-6
**When Preservative Treatment of Wood Is an Economy,* 165
**Weights of Various Woods Grown in the United States,* 218
**A Hundred Definitions Pertaining to Wood and Other Forest Products,* 240
**Computed Thermal Conductivity of Common Woods,* 248
***Significance of the Discolorations in Aircraft Veneers: American Beech, For. Path. Spec. Release,* 16
***Diagnostic Features of Some Discolorations Common to Aircraft Hard Woods, For. Path. Spec. Release,* 19
***Significance of the Discolorations in Aircraft Lumber, Spruce, For. Path. Spec. Release,* 21
***Some Books About Wood,* a List, R399
***Use of Chemicals in Forest Fire Control,* R-1199
***Wood in the National Economy,* R-1465
Other publication lists issued by the Forest Products Laboratory:
*****Boxing and Crating*
*****Building Construction Subjects*
*****Chemistry of Wood and Derived Products*
*****Fungus Defects in Forest Products*
*****Glue and Plywood*
*****Growth, Structure, and Identification of Wood*
*****Logging, Manufacture, and Utilization of Timber, Lumber, and Other Wooden Products*
*****Mechanical Properties of Timber*
*****Pulp and Paper*
*****Seasoning of Wood*
*****Use of Wood in Aircraft Construction*
*****Wood Finishing Subjects*

Walker-Turner Co., Inc., South Ave. at Berckman St., Plainfield, N. J.
Machine Tools for Industry (catalog)
Machine Tools for Metal, Wood, Plastic (condensed catalog)

Wallpaper Institute, 19 West 44th St., New York 18, N. Y.
Training Painting and Decorating Apprentices

West Coast Lumbermen's Association, 1410 S.W. Morrison St., Portland 5, Ore.
Sawdust Trails — a Student's Digest of Logging and Lumber Manufacturing in the Douglas Fir Region
More Timber (the forestry program for the Douglas Fir Region of Western Oregon and Western Washington)

Woodcraft Equipment Co., Independence, Mo.
Syllabus on Archery (single copies free)

X-Acto Crescent Products Co., Inc., 440 4th Ave., New York 16, N. Y.
Building Your First Flying Models — 25 cents

*Technical Notes
**Processed Reports
***Other Government Publications
****Lists of Publications

Paper Sculpture — 25 cents
Whittling Is Easy With X-Acto — 25 cents
How to Build Scale Model War Planes — 15 cents
The Boat Whittler's X-Acto Handbook — 10 cents

Yates-American Machine Co., Beloit, Wis.
Chats on Period Styles of Furniture — Duncan Phyfe style only
Short Talks on Wood (incomplete sets available; include talks on sycamore, ponderosa pine, Idaho white pine, western hemlock, yellow birch, American elm, Sitka spruce, yellow poplar, black cherry, mahogany, and basswood)
Education Through Woodworking — $2.50 (limited number on hand)

(*To be continued*)

Problems and Projects

GLASS-TOP NUT BOWL WITH HAMMER AND ANVIL

V. D. STAPLEFORD
Bassett Junior High School
New Haven, Conn.

This interesting glass-top nut bowl will always attract attention in any school shop.

The bowl is the result of an attempt to break away from the timeworn, open-top, turned bowl that is usually constructed. The construction involves an amazing number of lathe and tool operations. Even though considerable accuracy is required, ninth-grade students have turned out entirely satisfactory results. This project will interest the most advanced student. The various phases met in the construction appear to fascinate the boy and hold his attention right up to the last operation. Cutting the glass and drilling it practically stopped all work in my shop until it was completed, and the students were very pleased with themselves when they finished the job.

The construction of the patterns of the hammer and the anvil offer the instructor an ideal chance to present a few related lessons on foundry work so that the students can see a practical application.

The castings may be made in any brass foundry at reasonable cost.

Turning the Base of the Bowl and Cover

1. Select the desired wood and glue it together with the grain of all the pieces running in the same direction. Waterproof glue is best for this work. Clamp securely and allow to set for the proper time. For sizes see Figure 1.

2. Remove clamps and face off one surface flat. This will be the base of the bowl.

3. Draw diagonals and mark the diameter of the bowl with a compass. Band-saw to line.

4. Center the faceplate and place on the lathe. Turn bowl until balanced. Face off the top of the bowl.

5. Turn outside of bowl to proper shape using template for accuracy. See Figure 1.

6. Turn seat for the cover and hollow inside until proper thickness of the sides is obtained. This will depend upon the kind of wood used. Leave slightly thicker walls if the wood is soft.

7. Check seat for the anvil to be certain it is the right size and sand the inside completely. Be sure the seat is low enough for the anvil to fit inside the cover. While the lathe is turning, locate the exact center of the anvil seat. This will aid in boring the hole for the machine screw later.

8. Band-saw the cover roughly to size leaving about ¼-in. waste all around. Screw the faceplate on and turn to accurate diameter.

9. Face off the inside of cover and turn seat to fit the base of the bowl. This must be a hand-pressed fit.

10. Hollow out inside of cover to proper shape. Cut seat for the glass being certain that you have allowed for the thickness of the glass plus the ring that holds the glass in place.

11. Sand inside of cover completely. Apply desired finish.

12. Remove cover from faceplate and chuck on the base of the bowl. Place the

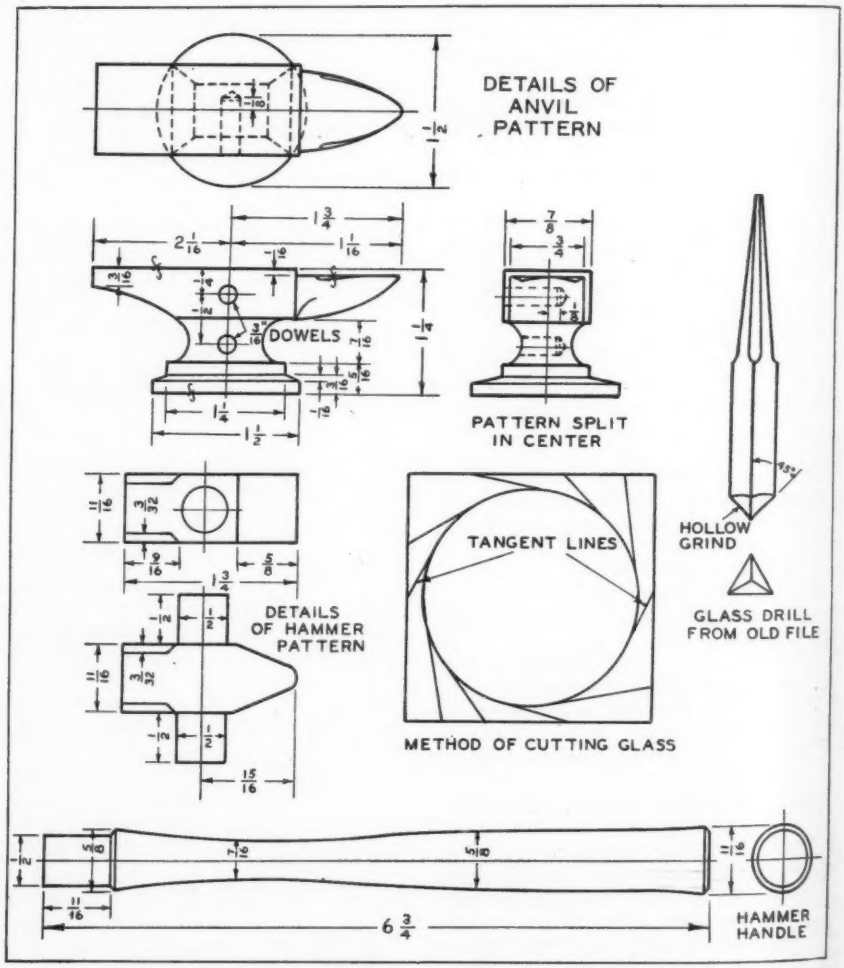

Fig. 2. Patterns for hammer and anvil

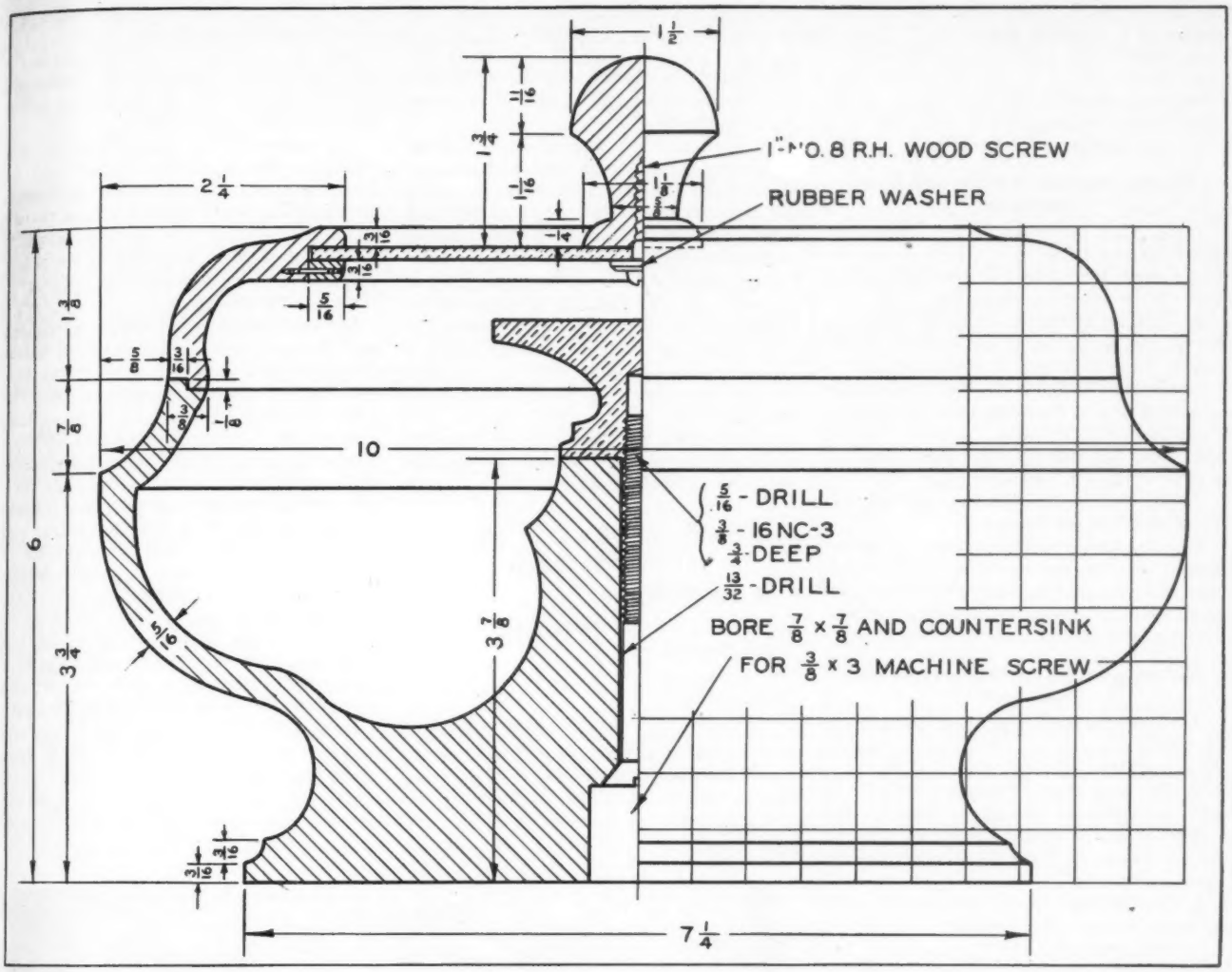

Fig. 1. Base and cover of nut bowl

dead center up against the cover for added safety.

13. Turn outside of cover to size and shape not cutting out the opening for the glass at this time.

14. Sand the outside of the entire bowl.

15. Measure for and turn opening for the glass. This must be done carefully in order that the waste center does not put dents into the inside of the bowl when it breaks loose.

16. Round off the edge of the opening and sand. Remove from the lathe and counterbore the 7/8-in. hole in the base. Bore the 3/8-in. hole for the machine screw working from the top of the bowl for accuracy. Apply finish.

Making Pattern for the Anvil

1. Square up two 5/8 by 1¼ by 3⅛-in. blocks of pine or mahogany. See Figure 2.

2. Drill holes for the dowels as shown in the drawing, keeping both pieces clamped together. Notice that the dowel goes all the way through one piece but only ⅛ in. into the other.

3. Cut the dowels and chamfer the ends so that they will enter the holes easily. Glue them into place so that they protrude ⅛ in.

4. Fit the two pieces together (do not glue) and trace the pattern on the side and end.

5. Cut to shape on the jig saw cutting out the end view first. Tack the side pieces back on and saw out the side view.

6. Whittle and file to shape, being certain that all surfaces taper back from the center of the pattern two or three degrees. This taper or draft is necessary to aid the foundry worker in drawing the pattern out of the sand.

7. Sand thoroughly and apply two coats of white shellac, sanding each coat smooth.

Making Pattern for the Hammer Head

1. The pattern may be made out of pine or mahogany. Cut the wood to size as shown in Figure 2, and lay out the shape on both sides locating the spot for the core print. Using a compass or dividers, scribe the circle where the print will be fastened on. The core prints are made from half-inch dowels and secured in place with glue and brads. This is done after the pattern is completed.

2. Sand smoothly and shellac the head with clear shellac. The core prints should be given a coat of black shellac. This may be made by adding lampblack to white shellac.

3. The eye of the hammer is ½ in. in diameter so it is not necessary to make a core box for the core as most foundries have stock cores of this size.

Turning Ring to Hold Glass

1. Band-saw a piece of 13/16-in. stock slightly larger than the opening for the glass.

2. Mount on faceplate and face off the surface of the wood. Turn diameter until it fits snugly into the glass opening.

3. Use the parting tool and cut the ring to the proper thickness.

4. Using parting tool, cut the ring to the proper width leaving a fine sliver of wood holding it on.

5. Sand the ring carefully and cut it off with the point of a sharp knife or with the

toe of the skew chisel while the lathe is turning at a very slow speed.

6. Using a fine brad for a drill, make a hole about every 2 in. all around the ring. These are necessary for fastening it to the cover. Hold the ring between the jaws of a vise while drilling or it may split.

Turning Hammer Handle and Knob for Cover

1. Cut stock for the handle 1 in. longer than called for in Figure 2.

2. Center the ends and place the piece between the centers of the lathe.

3. Turn to dimensions shown in Figure 2, having the small end of the hammer handle toward the dead center.

4. Fit the handle to the head reasonably accurately before removing from the lathe.

5. Sand and apply finish.

6. Drive into hammer head and wedge with a piece of brass or hardwood.

7. The knob is turned in the same manner. For dimensions see Figure 1.

8. Note that a rubber washer is placed against the glass before turning in the screw that holds the knob in place. This is advisable to prevent the glass from breaking. A rubber faucet washer may be used for this purpose.

Finishing Rough Castings of Hammer and Anvil

1. Center-punch the center of the base of the anvil, and drill a 5/16-in. hole about ¾ in. deep. Thread the hole with a ⅜-in. tap.

2. The base must be made quite flat. If you are fortunate enough to have a disk sander or emery sander it may be done on one of these. A file may be used for the same purpose.

3. Drawfile all exposed surfaces as noted by finish marks in the drawing.

4. Buff to a high polish.

5. Drawfile all surfaces of the hammer and polish the same as the anvil.

6. One end of the cored hole should be slightly elongated to give the handle better holding power.

Cutting the Glass for the Cover and Drilling the Hole

1. Use single or double-thickness glass.

2. Measure diameter of glass opening and cut out a circle slightly smaller.

3. Place glass over pattern and outline the diameter of the circle with a sharp glass cutter.

4. Make various tangents to the circle as shown in Figure 2.

5. Locate the center of the glass and make a tiny mark.

6. Hold the glass in your hand and tap the underside lightly with the ball on the end of the glass cutter. Work all around the circle until a section drops out and then remove all the rest.

7. The edge of the glass may be smoothed with an old oilstone.

8. Break an old, three-cornered file about an inch from the tang and grind the point as shown in Figure 2. Note that the three flat surfaces are slightly hollow-ground over the edge of the grinding wheel.

9. Build a dam around the center of the glass with putty and fill with turpentine. This acts as a cutting lubricant and prevents the dulling of the drill.

10. Place drill in a brace and rotate slowly on the center mark using very light pressure. Warning — if too much pressure is applied the glass will break. The weight of the brace is nearly enough at first. As the hole becomes deeper more pressure may be applied. Do not attempt to keep the brace from wobbling as the drill will cut faster if a very definite wobble is given to the brace as it rotates.

11. Allow the powdered glass to remain in the hole as this acts as an abrasive and makes the drill cut faster. Drill until the point comes through and then turn the glass over and finish from the other side. With reasonable luck it should be possible to drill the hole in about five minutes.

ART METALWORK IN STAINLESS STEEL

F. N. NEWTON, JR.

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For a number of years in our general metal shop we have been making various projects out of aluminum, copper, and a metal called Garaloy. All of these metals hammer out well in metal or wooden forms or dies. They also take a high polish but the Garaloy loses its polish in a very short time even when it is given a coat of clear lacquer.

Our city is primarily a steel center and is the home of the Sharon Steel Corporation, which was one of the pioneers in the making and rolling of stainless steel.

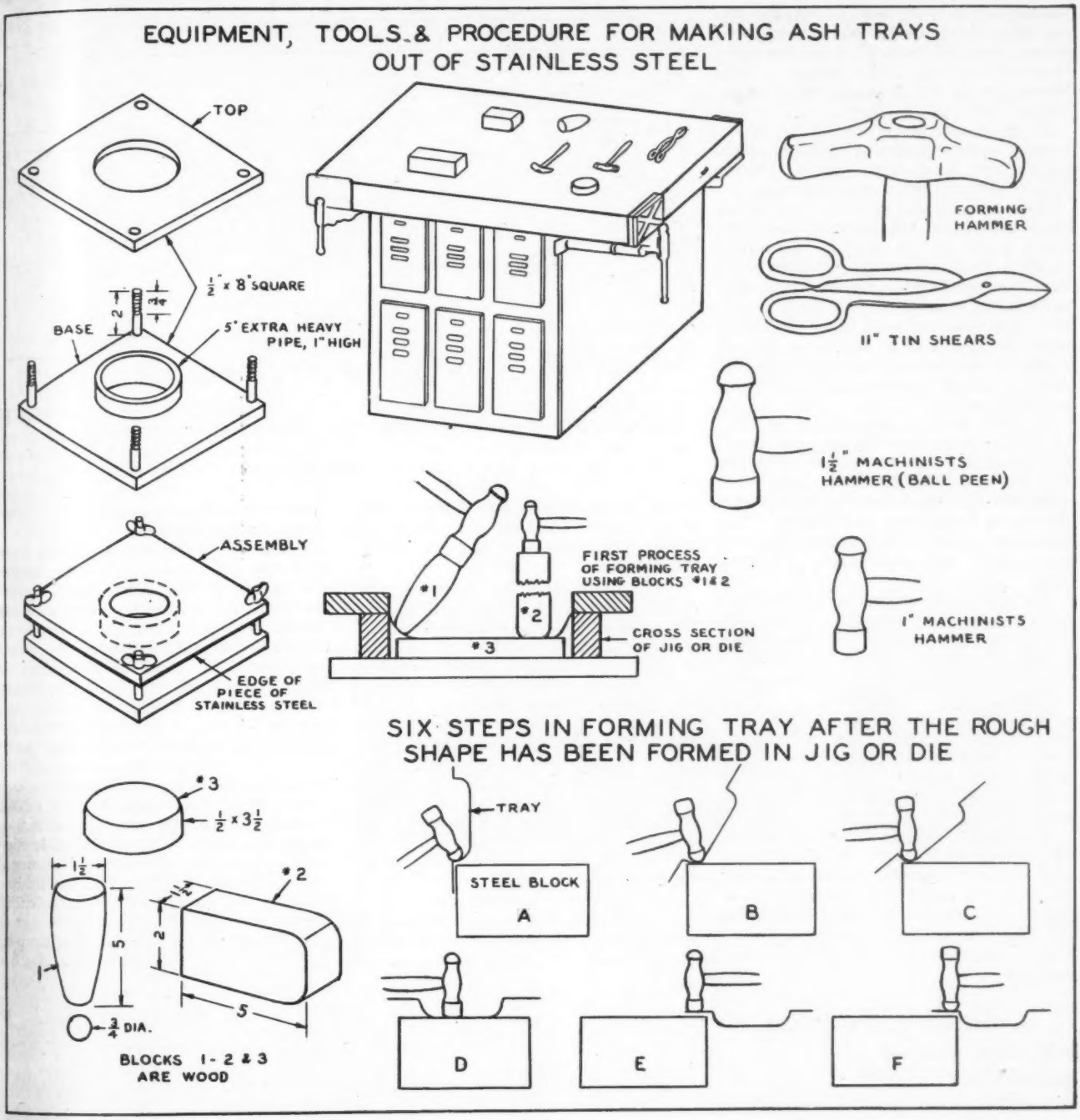
The writer felt for a long time that if it would be possible to use stainless steel for project purposes, that the finished work would be something worth while for boys to take home. Further, that the experience gained in working on stainless steel projects would be a very worth-while experience for students in our art metal classes.

We have access to all gauges of stainless steel through the co-operation of the Sharon Steel Corporation, and the writer has been carrying on various experiments with this metal for some time and for a considerable time without much success. I tried three different thicknesses of the metal, namely .025, .015, and .011 in., but was unable to do it successfully because I could not hold it firmly enough. Stainless steel is a very tough, hard metal, and it was practically impossible to hammer it to any desired shape while holding it by hand.

Finally, I decided to make a jig or die which would not only be a jig to hold the piece to be hammered, but would also be a form on which I could hammer out the rough or preliminary shape of the object I wanted to make. The first project was an ash tray and later I made different sizes of jigs so we could make ash trays of various sizes.

The jig was made as shown in the accompanying illustration and the explanation of making it and using it follows:

Examples of stainless steel art metalwork



The base and top of the jig are made from rough steel plate, but can be finished all over, which makes a nicer looking jig. The two plates were put together and near the four corners holes were drilled through both plates; the size of the holes were for a half-inch standard tap. The holes in the bottom plate were then tapped and the studs pulled in not quite ⅛ in. from the bottom so they could be spot-welded on the under side. The top plate holes were then drilled to 9/16 in. to allow for clearance on the studs. The top plate had a hole bored in it the same size as the inside of the diameter of the pipe to be used for a working area.

The first jig made was for a 5-in. pipe, the inside diameter of which was 4 13/16 in. Five-inch double strength steel pipe, 1 in. high was used. This was welded in the center of the bottom plate. It was then put in a lathe and faced off and bored out just cleaning it up, after which a slight radius was cut around the inside edge. This completed the jig. The operation of the work from there on was relatively simple. The pieces for the entire jig can be machined, and this procedure is recommended for the school shop in order that students may get the experience.

A piece of stainless steel 8 in. square was then cut off, and the four corners were cut off on a diagonal so the piece would clear the studs when set in place. Between the piece of stainless steel and the top of the pipe a piece of rather heavy paper should be placed so that the stainless steel will not be scratched or marked. When the piece has been put in place, the top plate is put over it and the four wing nuts are then pulled up just tight enough so the piece is held firmly. With a

hammer and a block made of oak like the one shown in the illustration, keep on hammering all around the piece of stainless steel. Occasionally, use a larger oak piece and hammer nearer the center of the sheet of stainless steel.

If the stainless steel piece is not to be indented very much, place a round oak block into the pipe. About ½-in. depth seems to be most satisfactory from a working angle.

Keep on hammering until the rough shape of the ash tray has been produced; then take it out of the jig and polish the hammered part with No. 0 steel wool until the high spots show. Then put it back in the die and continue to hammer the high spots with the large oak block until the cavity is smooth all over, after which the tray is taken out of the die and finished by hammering it against a steel block using a peening hammer and a forming hammer.

The tray should be held against the steel block in an almost vertical position and turned and peened until the entire circumference has been gone over. Then the tray is tipped at an angle and the same process repeated, until the tray is peened clear to the bottom. The illustration of the six steps in forming shows the procedure better than words can describe them.

After the depth of the tray has been finished, the outside rim is hammered and peened. The tray is then trimmed, after which it is polished on a buffing wheel. If a round shape is not wanted, a jig of the desired shape must be made.

The entire project furnishes the boys with some excellent experience, for we later had the boys make their own drawings of various shaped jigs, then made the jigs, and finally, used the jigs to make the projects to take home.

The nice part of using the die was the fact that we work on as tough a metal as stainless steel without having to go to the trouble of annealing the metal. This permitted us to buff the trays with a wire wheel without losing the fine finish quality of the metal, which would have been lost had the metal been annealed.

A THREE-TUBE INTERCOM

HORACE P. MACNAB

Elizabeth, N. J.

A small intercommunication system set up in the writer's home has done away with telephones between his shop and "upstairs," as well as being a source of endless pleasure to his children. With the master located on the upper floor it is also possible to investigate noises heard in the cellar at times when there should be none.

The circuit, which was designed and first built by Robert Mrozek of Elizabeth and operator of "Ham" station W21AY, has proved very satisfactory and extremely easy to wire. Neither the chassis nor the cabinets need be constructed by the builder as both items can be purchased from any one of several supplies of radio parts. However, plans for both items are included in this article and should be a source of pride to the builder when completed.

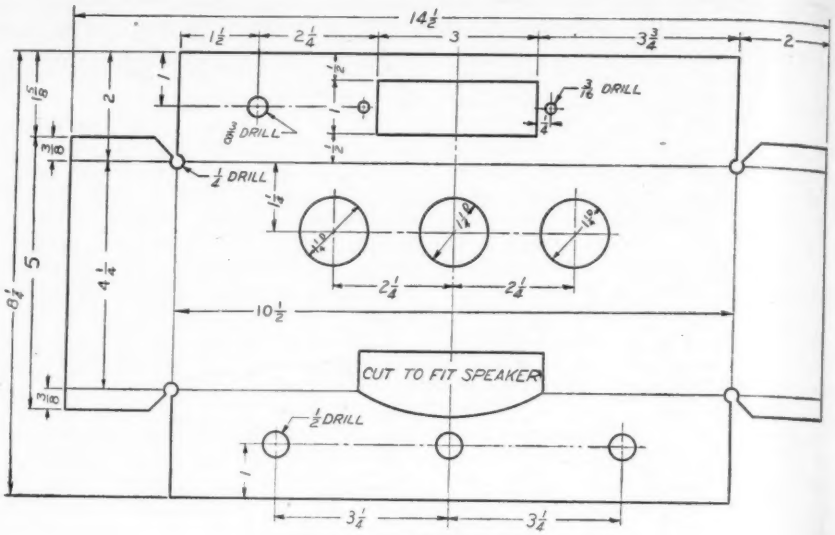


Fig. 1. Chassis layout

The first step, after assembling the parts, should be the construction of the chassis. Cut the metal to shape and size as shown in Figure 1. If no brake is available the bends can easily be made by clamping the sheet between two pieces of angle iron or hardwood in a vise. A mallet carefully used will produce a neat true bend along the scribed lines. First fold the four ⅜-in. laps, then the two ends and last the front and back. This must be carefully done in order that the chassis be perfectly square and flat across the bottom. You may make most of the holes for sockets, switches, bolts, rivets, etc., either before or after folding, but you will find it wiser to drill and file the larger holes first. The corners may be either soldered or riveted together.

A professional look may be obtained by painting the chassis with one of the crackle finish lacquers now found on the market, though a coat of aluminum paint may be used to obtain a suitable finish.

Wiring can be the next step. First install all sockets, transformers and choke, and the dual condensers. You will notice in Figure 2 that the input transformer is placed below the chassis, but if you prefer you may turn this transformer at right angles to the output transformer. The choke, whether above or below, should be installed at about a 45-deg. angle from the core laminations of the transformers. Location of these units will depend on the available room. At this time also, install the volume control, off-on switch and the double pole-double throw talk-listen switch.

With these main units installed on the chassis the actual wiring may be started. One thing to keep in mind is to keep all leads as short as possible. The order is immaterial, but perhaps the filament connections had best be made first. As you will see in the circuit diagram these are wired in series, the current going through all filaments including the pilot light. If a resistor line cord is used, give it a

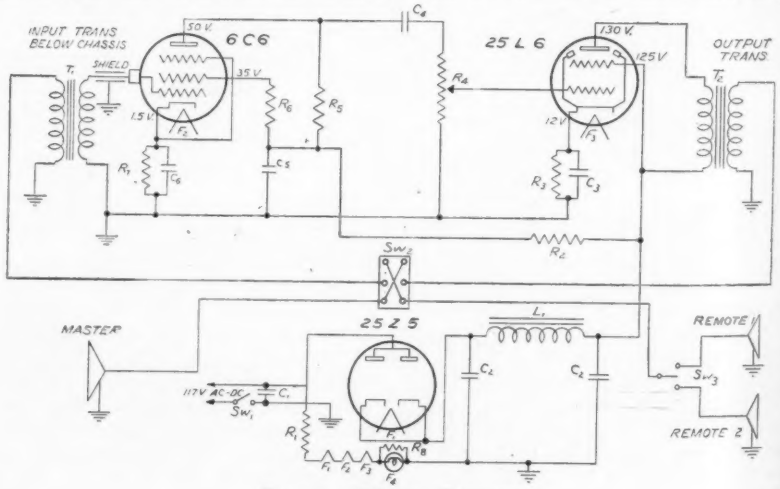


Fig. 2. Wiring diagram

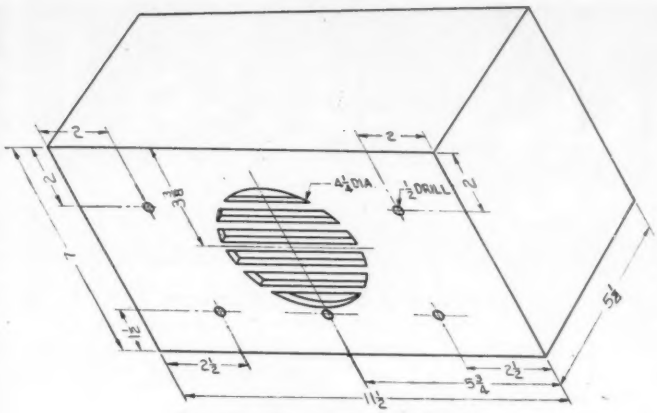


Fig. 3. The master cabinet

continuity test or have the three wires marked when purchased so that the resistor is known, and wire this according to the plan. Both the grid lead of the 6C6 and the tube itself should be shielded, with the grid lead shield soldered to the chassis for a good ground connection. While completing the wiring it is a good idea to go over each line on the circuit diagram with a colored pencil as you progress, so that you will always know what has been completed and what remains to be done.

Permanent magnet speakers, 4 in. in diameter, have been suggested though larger or smaller sizes may be used. If one voice coil lead of the master speaker is already grounded you need only ground the frame of this speaker to the chassis. If both V.C. leads are insulated from the speaker frame, one of them must be grounded directly to the chassis, and one of the leads from each remote speaker leading back to the amplifier must be grounded at the binding post. All speakers may be mounted directly in their respective cabinets behind the grills, but wiring is simplified if the master speaker is mounted on the chassis flush with the front edge.

The cabinets are our next consideration. The dimensions need not be strictly adhered to, and of course if the speakers are other than 4 in. in diameter larger or smaller grill openings should be cut. (See Figure 3.) The writer's cabinets were made of ¼-in. walnut plywood, but any wood may be used, the only consideration being to keep the front panel down to ¼ in. to facilitate mounting the pilot light and the various switches. After assembly with glue and brads, veneer the exposed edges of the plywood cores with strips of the face wood. In finishing, follow the usual procedure of filler, stain, and varnish with fine sandpaper used between steps in order to get as smooth a surface as possible. A well-polished coat of wax should give the finished cabinets a professional appearance.

Before installing the chassis in the cabinet mount the pilot light, the remote station switch and the talk-listen switch with leads long enough to extend under the chassis. After making these connections install the amplifier in the master cabinet and connect the remote speaker or speakers to the terminals on the back of the amplifier as shown in Figure 4. Plug the amplifier into the power line, give the tubes a minute or two to heat up, then test. If there are no results check over your complete wiring, making sure that all tubes and the various components of the circuit are in perfect working order.

BILL OF MATERIALS

R1 200 ohm line cord or 200 ohm, 25 watt wire wound
R2 12,000 ohm, 1 watt
R3 150 ohm, 1 watt
R4 500,000 ohm potentiometer

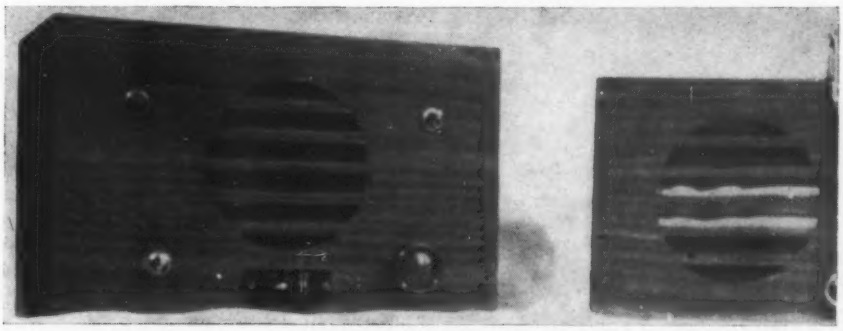
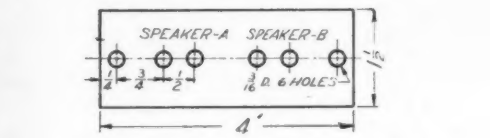
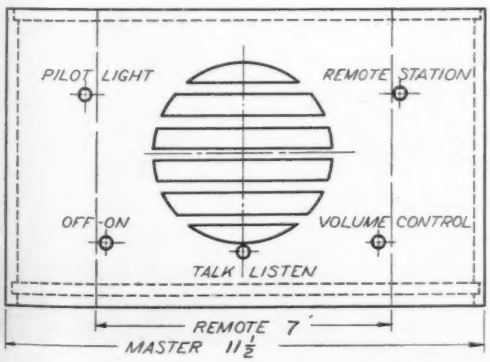
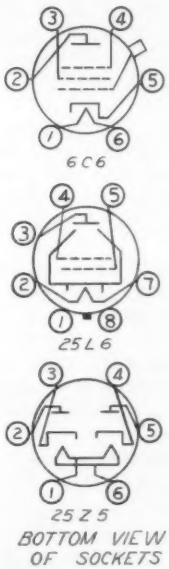


Fig. 5. Master and remote cabinet of three-tube intercom



BAKELITE OR FIBER TERMINAL STRIP FOR REMOTE SPEAKER CABLES

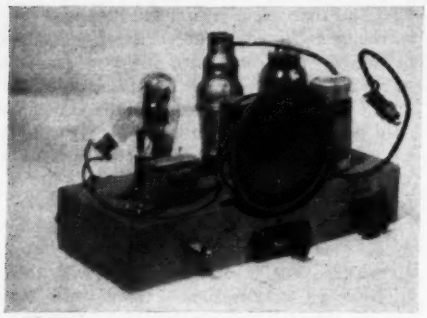


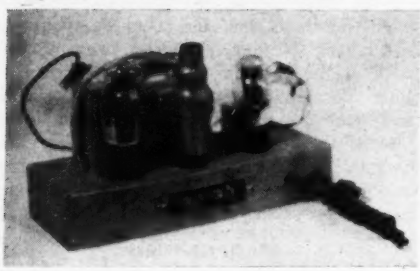


BOTTOM VIEW OF SOCKETS

Fig. 4. Details of master and remote cabinet

R5 250,000 ohm, 1 watt
R6 1 meg., 1 watt
R7 3500 ohm, 1 watt
R8 50 ohm, 1 watt
C1 .05 uf., 400 v.
C2 Dual 20–20 uf., 150 v.
C3 10 uf., 50 v. may be a dual unit or two single units
C4 .03 uf., 400 v.
C5 8 uf., 450 v.
C6 10 uf., 50 v. may be a dual unit or two single units
L1 filter choke, Thordarson No. T14C64, 10 henrys, 55 ma.
T1 input Xformer, Stancor No. A4744
T2 output Xformer, Thordarson No. T13S42
Sw1 S.P.S.T.
Sw2 D.P.D.T.
Sw3 S.P.D.T., or use gang switch with circuits equaling number of remote speakers.
F4 6.3 v. pilot light (brown bead), use colored "jewel," through panel mounting
Speakers (2 or more), 4" dia. P.M.
Chassis, 1 pc. No. 20 ga. galvanized iron 8¼" x 14½"
Master cabinet, 1 pc. walnut plywood ¼" x 7" x 45"
Remote cabinet, 1 pc. walnut plywood ¼" x 6" x 31½"
Grill cloth, 5" x 5" for each speaker used
1 knob for volume control





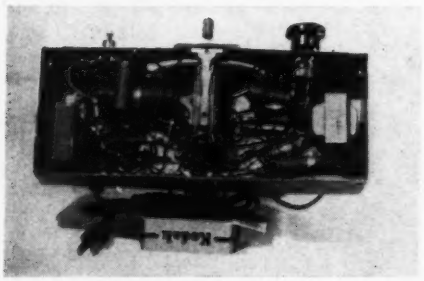


Fig. 6. Chassis of three-tube intercom

2 (or more) binding posts for remote speaker connections
2 conductor cord for remote speaker cable
Stain, filler, varnish, glue, brads, nuts, bolts and rivets

WHITTLING: A UNIT IN TEACHER TRAINING

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We do not find many references as we turn our attention to the lost art of whittling. Whittling has played an important part in the growing up of most boys. Nearly every small boy has at one time spent hour upon hour cutting away on a willow, cottonwood, or pine twig to make a whistle or a two- or three-tone flute. This type of hand activity took up many leisure hours and kept young hands and minds occupied.

While not much has been written concerning this art, we find material pertaining to it under the heading of various types of carvings. All our leading museums have collections of the early art of the Chinese, Japanese, European, and the South Pacific Islands, as well as our Early American art.

Examples of whittled projects

We know that great men such as Washington, Lincoln, Franklin, Jefferson, Whitney, Whittier, Mark Twain, Paul Revere, Samuel Morse, and others excelled in handwork and made it a part of their life although we remember them for their accomplishments in other fields.

Many people have whittled their way to a fortune. As we know, many of the original models presented for patenting were made in this manner. As an example of this: Sam Colt, at the age of 16, while idling his time aboard the brig Corlo, whittled out a model for a pistol with a revolving cylinder. This was the first Colt Revolver and made Sam a millionaire.

For those who are unfamiliar with the make-up, or structure of wood, the greatest hidden element is the importance the direction of the grain plays in the cutting, planing, chiseling, assembling, and finishing of any wooden object.

I have set up whittling as a unit in teacher training because it presents the easiest, most enjoyable, most profitable and pleasing method of teaching the full meaning of grain, its direction and uses for proper strength.

Figure 1 shows the result of a few hours with a knife, a few pieces of wood and simple sketches (most of which were supplied by the X-Acto Company), and this work was done by girls.

Directions:

1. Use a penknife, Sloyd knife, or a commercial type such as X-Acto.
2. Select a piece of wood large enough for whittling the model that has been chosen. The wood may be balsa, pine, whitewood, or the like.
3. Place the pattern on the wood so that the direction of the grain will give the maximum strength.
4. Whittle out the profile first.
5. Now sketch in the front and rear views.
6. Whittle these views next.
7. Round all edges but do not sand.
8. Stain.
9. Shellac or varnish.
10. Paint in any necessary features.

In this way the teacher-training candidates meet, overcome, and master all the necessary tricks needed in conquering the problem presented by the grain in the wood.

This same unit is good for the club period, the hobby group, and in classes of retarded students.

ELECTRIC HEATER

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I have always been of the opinion that the industrial-arts department of a school can more readily help a pupil develop those qualities that make the individual a worthy member of a family, than any other department in the school. Worthy home membership as an objective should not be thought of as something in the future, but should be a present reality. Bearing this in mind, I have tried to suggest projects to my students that are really useful, and of which the home is in need.

The project selected for this issue is a very efficient electric heater that may be constructed at a nominal price.

Tools and materials necessary:

I. Material
1. Automobile headlight
2. Cone shaped electric heater coil
3. Porcelain socket
4. Six feet of asbestos covered wire
5. Two bases, 18 ga. copper (brass or galvanized iron may be used)
Base *A*, 5½ by 8½ in.
Base *B*, 4¾ by 7¼ in.
6. Electrical fittings, swivel socket, pipe fittings and male plug.

II. Tools: scratch awl, steel ruler, straight

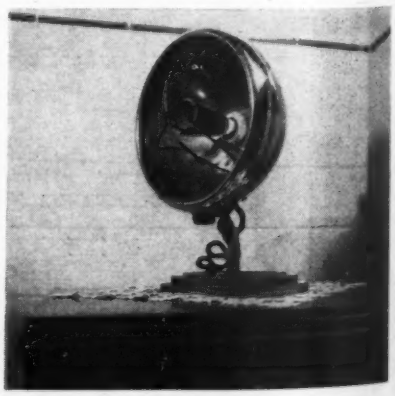

Fig. 2. The finished heater

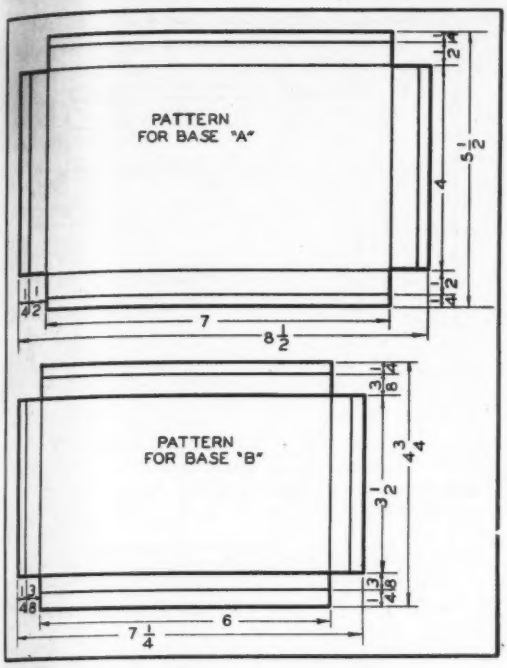

Fig. 1. Bases for electric heater

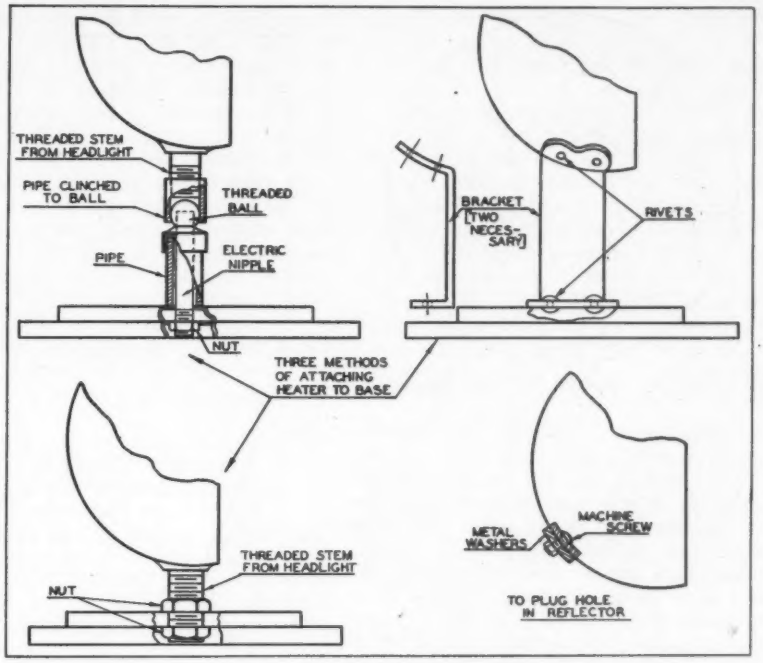

Fig. 3. Method of assembling electric heater

shears, hack saw, hammer, screw driver, soldering copper

Procedure

1. Lay out bases *A* and *B*.
2. Cut to shape shown in Figure 1.
3. Drill holes in center of *A* and *B* for fittings.
4. Hem and shape bases.
5. Remove rim from headlight.
6. Polish reflector with chrome polish.
7. Enlarge center hole in the reflector where the bright light formerly belonged, for a porcelain socket to fit in.
8. Plug up the hole in the reflector, left by the removal of the dim light. This may be done by making two washers out of a piece of bright tin or aluminum. One washer is placed in back of reflector and the other in front. Both are clamped to the reflector by a No. 6, 32 by ½-in. machine screw.
9. Coat inside of headlight with asbestos.
10. Connect asbestos covered wire to porcelain socket.
11. Insert reflector into headlight.
12. Bend three pieces of copper covered wire, as shown in picture, to fit headlight. The wire guard is put on for safety sake. See Figure 2.
13. Remove the glass from the rim.
14. Snap the rim into place to hold the wire.
15. Place fittings through base *A* and *B* and connect to headlight. The fittings will depend upon the headlight purchased from the automobile junk yard. If a swivel socket is not available, the use of a wing nut is suggested. See Figure 3.

SECTIONAL SPINNING CHUCKS

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When a sugar bowl, creamer, or vase is to be spun that is larger in diameter in the central section than it is at the open end, some type of collapsible chuck is necessary. Otherwise it would be impossible to remove the chuck after the blank is spun. These chucks are called by a number of different names, such as, split, multipiece, or sectional chucks. If the lock in the top of the split chuck and the force of the following block against the chuck will not hold the segments from flying out of position when the spinning operation is first started, a lock can be made in the base.

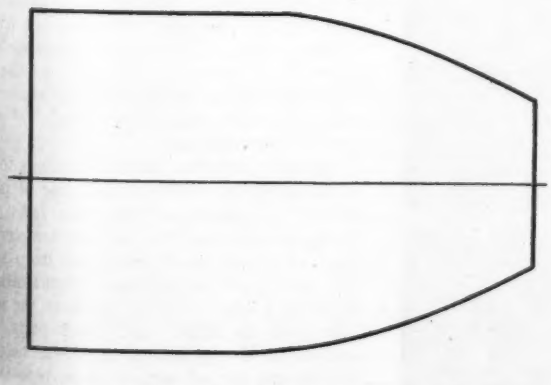

Fig. 1. Solid chuck

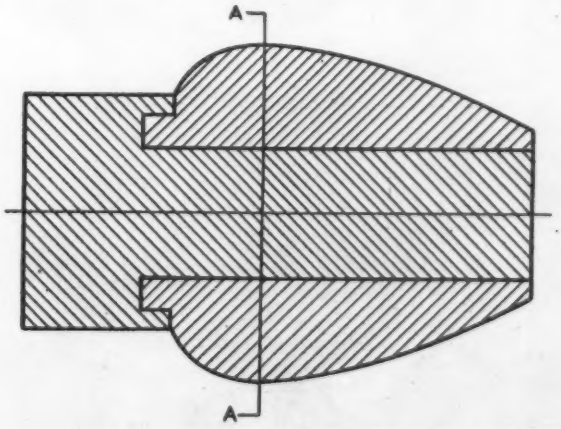

Fig. 2. Cross section of split chuck

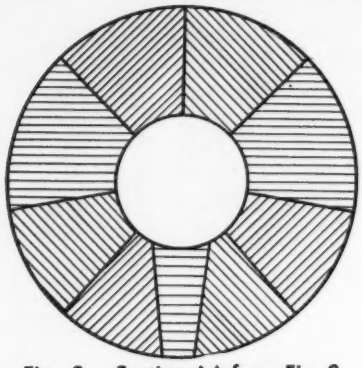

Fig. 3. Section AA from Fig. 2

Another method, probably a more satisfactory way of holding the segments, is to turn a solid chuck of the same design as the split chuck, which will carry the blank to be spun to the widest part of the design. The partly spun blank is then transferred to the sectional chuck and the spinning operation carried on in the usual manner. Figure 1 shows the shape of the first or solid chuck. Figure 2 illustrates the cross-section construction of the sectional chuck. Note the lock in the top of the chuck.

The first step in making a sectional chuck is to study the design carefully and determine how large a hole will be necessary in order to remove the segments. Next, a block of maple of sufficient size is selected and a hole bored entirely through the piece, with the grain. This operation can best be accomplished on the engine lathe. After boring the hole and before removing the block from the lathe, turn the male part of the lock on the end of the piece.

The next operation is to secure a piece of hardwood (maple preferred) to a faceplate of the spinning lathe and turn the plug and female lock to fit firmly into the hole and

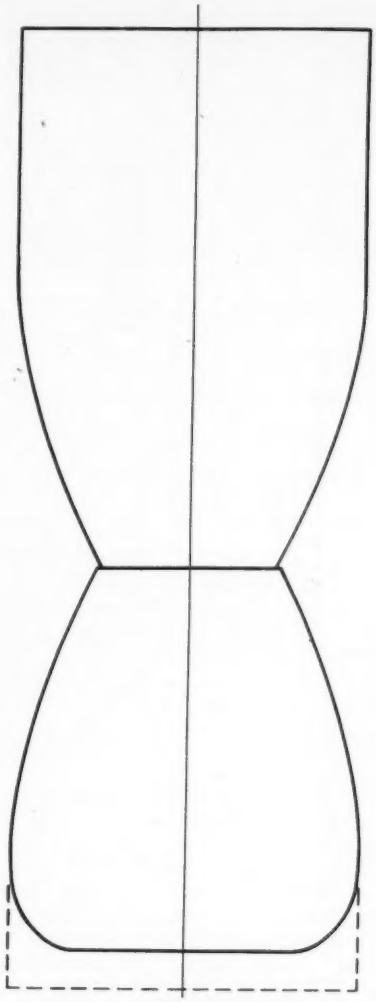

Fig. 4. Another type of solid chuck

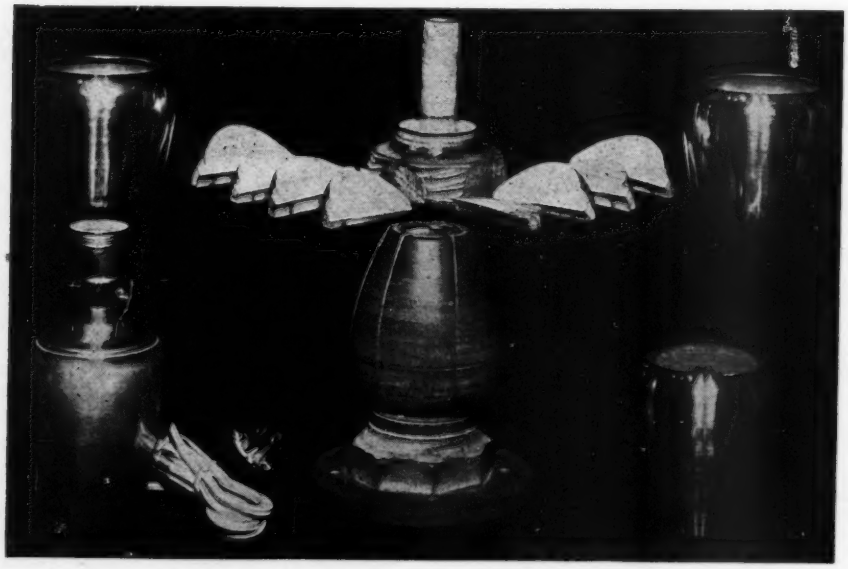

Fig. 6. Sectional spinning chuck and articles produced with it

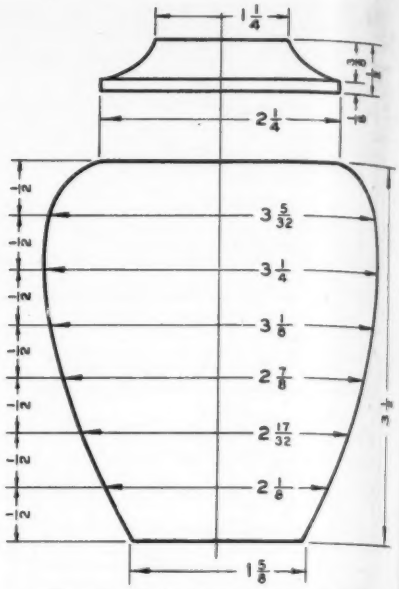

Fig. 5. The dimensioned chuck

lock of the first piece. Assemble the two pieces as a unit and turn to the desired shape. Remove the turned form from the plug and saw a key piece from the form. It is necessary that the key piece be wider on the inside than it is at the circumference so the key can be pushed into the hole after the blank is spun and the plug is withdrawn as illustrated in Figure 3. It will also be necessary to glue two pieces of wood to the key to compensate for the wood removed by the saw. The remaining chuck is then split into a number of parts with a chisel, hatchet, or ax. Be sure the pieces are sufficiently small so they can be removed from the hole in the open end of the spun shell.

Number the segments in rotation so that the chuck can be easily assembled.

Another method of accomplishing the same result, without making a split chuck, is to spin the shell over a chuck as illustrated in Figures 1 and 4, remove the partly spun shell and reverse the position as shown in Figure 4 (the dotted extension lines represent the partly spun shell). By carefully working the spinning tool back and forth, gradually closing the opening, the shell will soon acquire the desired shape. This process is commonly referred to as spinning on the air. A great deal of experience is necessary to perform this particular operation so that a number of pieces can be made identical.

Figure 5 gives the chuck dimensions for the lamp shown in the lower left side of photograph. The lower part was spun from a 16-gauge pewter disk 6¾ in. in diameter and the upper part which holds the lamp socket was spun from an 18-gauge pewter disk 2½ in. in diameter. The three members, the socket cap, and the upper and lower parts, were soft-soldered together. A 11/32-in. hole was drilled and tapped with a ⅛-in. pipe tap on the side near the base and a ⅛-in. rubber bushing screwed in.

The two vases pictured (upper right and left) were spun and closed in at the top over a chuck like the one shown in Figure 4. In the upper center of the photograph is shown a sectional chuck, and the plug, lock, and segments which comprise the chuck. The lower center pictures the split chuck assembled for spinning the lower part of the lamp on the left and vase on the right.

BEEHIVES

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The making of beehives is a very interesting as well as an educational project for machine woodwork classes. The planning requires a study of the design used in standard beehive construction.

This project may be used as a production job upon which several boys may do the work in the operations mentioned.

Inasmuch as several units are usually made there are many duplicate parts, and the making of these parts affords an excellent opportunity for employing production methods. If it has been decided to use this project as a class project, it should be broken down into the various operations by the instructor. After that has been done a demonstration of each operation should be given to the boys who are assigned to make the several parts.

The accompanying half tone shows five hives with supers, tops, and bottoms. Each super and each hive is equipped with ten honey extractor frames. In addition to those shown in the photograph, five other supers equipped with ten honey extractor frames, were also made in the writer's shop during a two-month period. A similar order was completed during each of the two preceding school years.

This equipment was made for a bee keeper in the community. Upon completion of the equipment it was delivered to the bee keeper and placed into actual use.

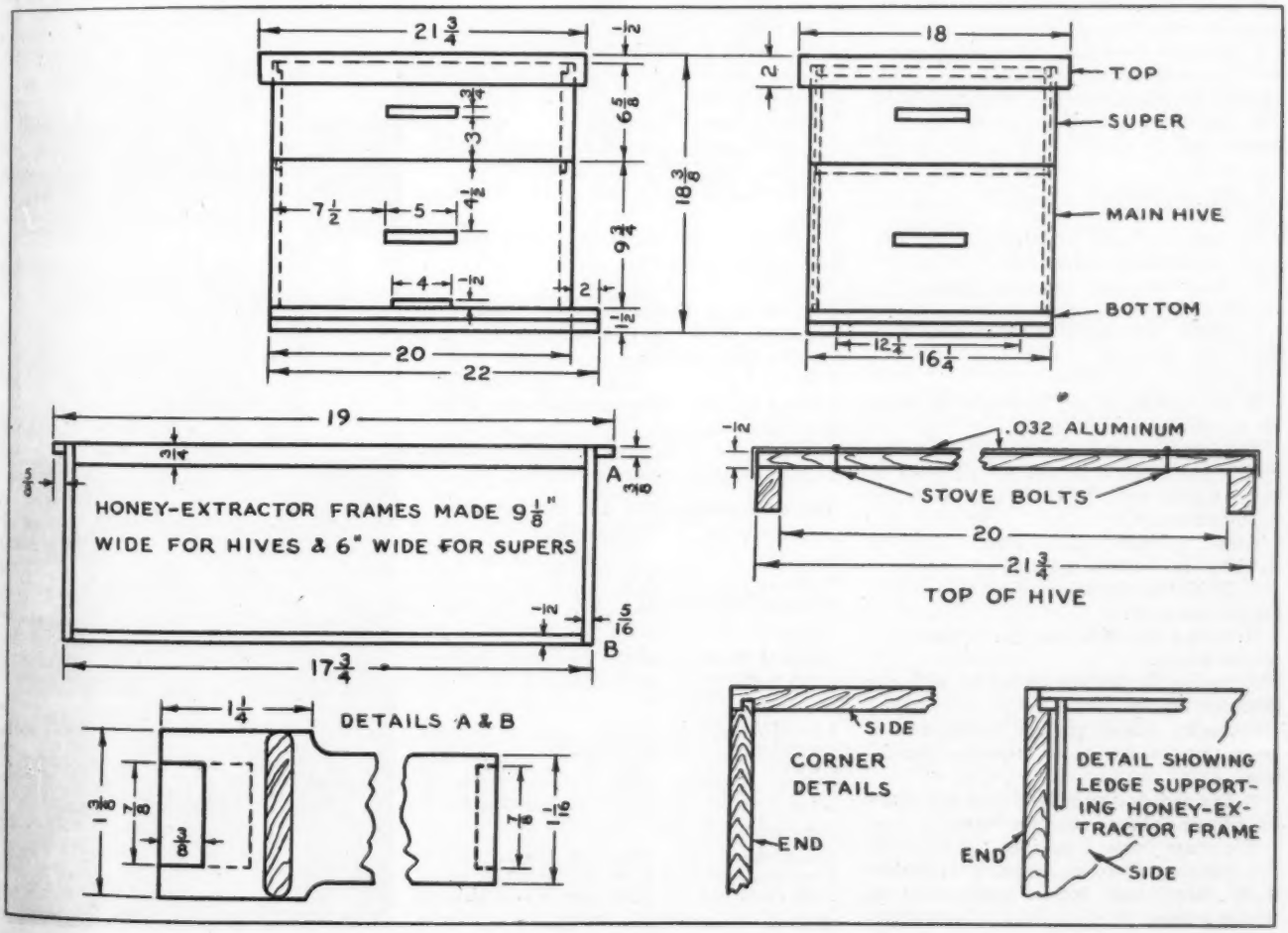
This design included the use of some metal-working due to the fact that the bee keeper requested that the tops be covered with aluminum, .032 in. in thickness as shown in the detail drawing. The metal protects the entire hive from moisture and the top lining protects the bees from excessive heat during summer.

The value of this project is reflected in the following:

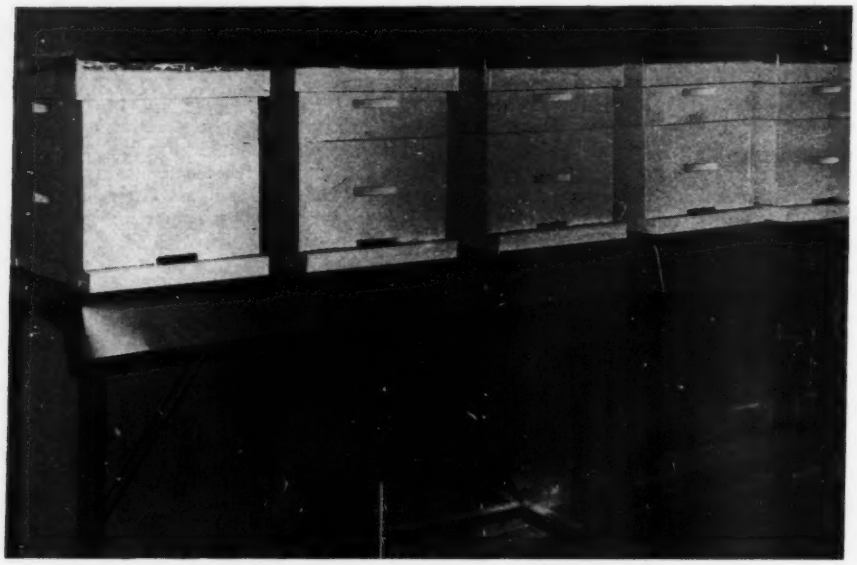
1. Provides opportunity for teaching machine woodworking processes that would not likely be possible otherwise.
2. Provides an excellent opportunity for teaching how duplicate parts are made.
3. Provides excellent opportunity for utilizing small scrap pieces of lumber that always accumulate in the woodshop.
4. Provides a fill-in for boys who complete their own projects and need something to do between projects of their own choice.
5. Provides a source of a necessary article that is almost impossible to obtain, since the opening of World War II.
6. Provides an excellent opportunity for teaching some of the elements involved in a *mass production assembly line* method in the woodshop. This situation fits in very efficiently into a vocational trade woodwork course.

The method of procedure used by the writer is as follows:

1. Get out stock for hives.
2. Get out stock for supers.
3. Saw joints in corners of hives and supers.



Beehive



Beehives — good machine-woodwork projects

4. Saw hand holds in sides and ends of hives and supers.

5. Saw ledges for supporting honey extractor frames in ends of hives and supers.

6. Assemble hives and supers using waterproof glue and nails for fastening.

7. Get out stock for honey extractor frames.

8. Saw joints in ends of honey extractor frames (nail 5 pieces together and saw all 5 at once).

9. Saw all shoulders on top bar.

10. Saw slit in bottom bar.

11. Sand all honey extractor frame parts.

12. Taper honey extractor frame ends.

13. Assemble honey extractor frames. Use aircraft nails for fastening.

14. Make bottoms as shown. Use brass screws for fastening.

15. Make tops as shown.

In the making of the hives the following list of operations are involved.

The power saw is used in:

1. Squaring stock to size for all parts of hives, supers, tops, bottoms, and honey extractor frames.

2. Making dado joints in corners of supers and hives as shown in the working drawing.

3. Making hand holds in sides and ends of supers and hives.

4. Sawing slits in bottom bar of honey extractor frames.

5. Sawing all shoulders on top bar of honey extractor frames.

6. Sawing rabbet grooves in top bar of honey extractor frames for suspending foundation.

7. Sawing ledges on ends of hives and supers for supporting honey extractor frames.

The power jointer is used in:

1. Jointing all edges necessary in making supers, hives, tops, bottoms, and honey extractor frames.

The band saw is used in:

1. Sawing joints in the ends of the honey extractor frames for the top and bottom bars.

2. Tapering bottom portions of ends of honey extractor frames.

The surfacer may be used to produce many of the parts of the supers, hives, tops, bottoms, and honey extractor frames, in planing to the special thicknesses.

The disk sander is used in:

1. Sanding ends and edges on pieces used in making honey extractor frames.

2. Sanding tapers on honey extractor frame ends.

3. Touching up corners of honey extractor frames after assembling.

The belt sander is used in:

1. Sanding parts for hives and supers.

2. Sanding all parts of honey extractor frames before assembling.

The drill press is used in drilling small holes in honey extractor frame ends for wires which hold foundation.

White pine is by far the most suitable material for making these beehives.

BILL OF MATERIALS FOR ONE COMPLETE UNIT

Name	*Size*
Main hive:	
2 sides of hive	¾ x 9¾ x 20 in.
2 ends of hive	¾ x 9¾ x 15¼ in.
Supers:	
2 sides of supers	¾ x 6⅝ x 20 in.
2 ends of supers	¾ x 6⅝ x 15¼ in.
Top:	
1 pc. of .032 aluminum	19½ x 23¼ in.
2 ends	¾ x 2 x 17 in.
2 sides	¾ x 2 x 21¾ in.
1 top	½ x 18 x 21¾ in.
Bottom:	
1 main piece	¾ x 16¼ x 22 in.
2 end cleats	¾ x 2 x 12¼ in.
2 side cleats	¾ x 2 x 22 in.
10 Honey extractor frames for hive:	
20 end pieces	5/16 x 1⅜ x 9⅛ in.
10 top bars	¾ x 1 1/16 x 19 in.
10 bottom bars	5/16 x ⅞ x 17⅛ in.
10 Honey extractor frames for super:	
20 end pieces	5/16 x 1⅜ x 6 in.
10 top bars	¾ x 1 1/16 x 19 in.
10 bottom bars	5/16 x ⅞ x 17⅛ in.

INDIAN SILVERSMITHING

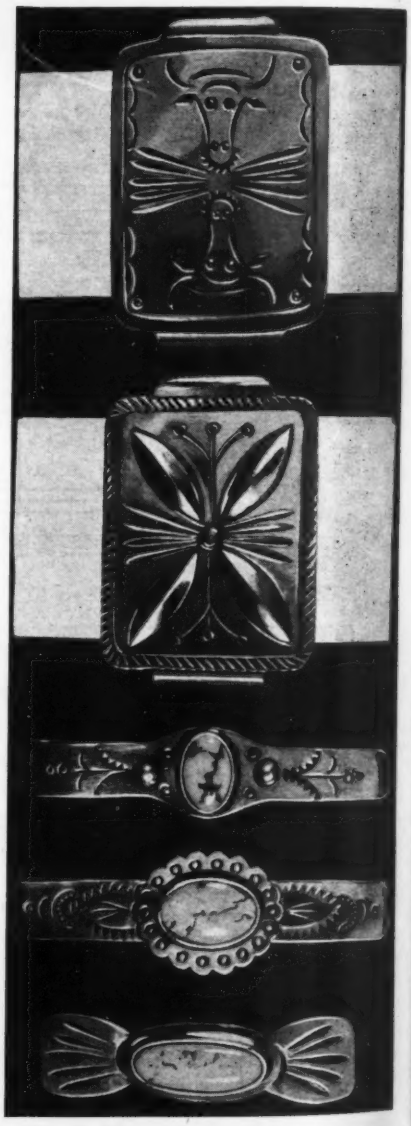
BEN HUNT

Hales Corners, Wis.

(Continued from page 132 of the March, 1948, issue)

Money Clips

The money clip is a new innovation in Indian silversmithing. The Indian, like everyone else, has to adapt himself to existing conditions and styles. The trader gets calls for money clips so he tells the Indian and, of course, the Indian makes them. But regardless of the fact that the idea is new, the



Money clips, tie clasps, and hair clips

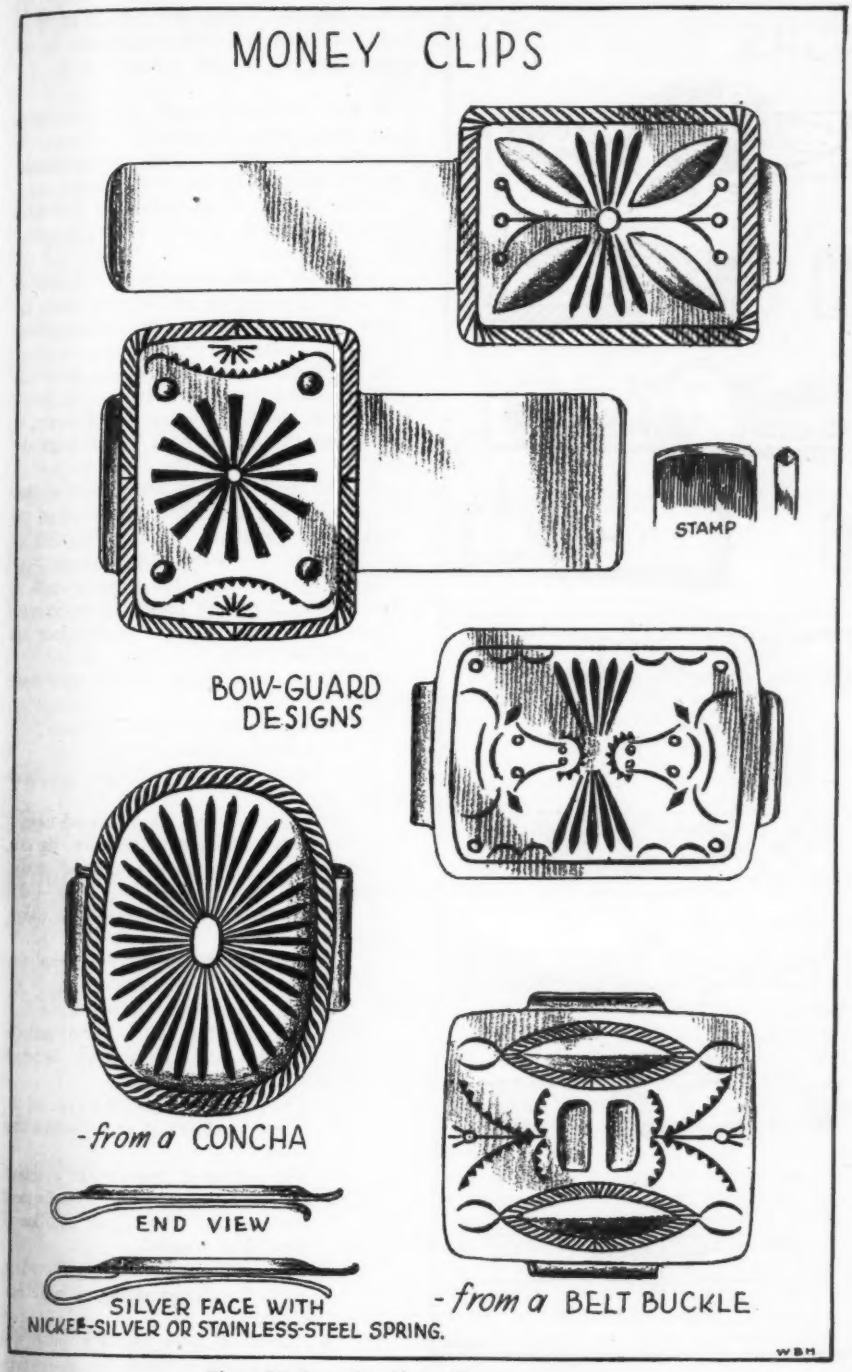


Plate 20. See also Plate 21 on next page

designs are strictly Indian. The Indian knows bow guards, buckles, and conchas, and those designs are adapted to the money clips that he makes with very gratifying results.

There is one drawback in making these clips and the tie clasps, and that is, that silver as it is heated for working, becomes soft and the springs on the backs of these clips should be of stiff springy metal.

There are two ways to overcome that difficulty. One is to use nickel silver and the other is to solder a clasp of nickel silver or stainless steel to the face. The one shown at the top of Plate 20 has a spring soldered to it while the one with the cows' heads is made of one piece of nickel silver. The tie clasps and hair clips, shown on Plate 21, also are made of nickel silver, the bezels being of sterling silver. Soldering is done as when working sterling silver. Metal can be 20-gauge or even a little thinner.

It is well to make the stamp, shown on Plate 20, for decorating these clips. Be sure to make the angle rather blunt, as that makes the stamping easier. For these stampings, use a straight liner first and then with this new stamp, follow the groove and widen it out to suit. The raised parts of the upper money clip in Plate 20 were bumped up from the back on the end of a log, as shown in Figure 7 on page 131, in the March, 1948, issue. There are no turquoises set in the money clips, because the stones would soon become scratched if the clip and other coins were kept in the same pocket.

Tie Clasps and Hair Clips

Tie clasps, just like the money clips, require a fairly good spring. Therefore, it is suggested that nickel silver be used. The clasps shown on Plate 21 were made of 24-gauge B. & S.

In making the hair clips, silver can be used throughout as the wire can be stiffened by drawing it through a drawplate. It is always good policy to buy a few feet of 10-gauge wire which can be drawn down to any size. The wire used on the hair clips is drawn down to 16 gauge, and if pulled through the last two holes without annealing, it will be springy enough and yet remain pliable so that it can be bent to the required shape.

INTRODUCTORY WOODWORKING TEST

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I. *Multiple Choice Exercises* (20 points)

Directions: Draw a line under the words which are needed to make correct statements.

1. Shellac is thinned with: (*a*) turpentine, (*b*) benzine, (*c*) alcohol, (*d*) kerosene.

2. The large protruding lump which is sometimes found on trees is known as a: (*a*) wart, (*b*) sap pouch, (*c*) pith cone, (*d*) burl.

3. A finishing nail is driven beneath the surface of a board with: (*a*) a nail punch, (*b*) an awl, (*c*) a nail set, (*d*) a center punch.

4. The light tan pigment which is used as the basic color in mixing maple stains is: (*a*) a raw sienna, (*b*) burnt sienna, (*c*) raw umber, (*d*) burnt umber.

5. When fastening a member to the end of a board, the anchor dowel is frequently used to secure: (*a*) bolts, (*b*) nails, (*c*) screws, (*d*) rivets.

6. The largest plane usually found in a woodworking shop is known as a: (*a*) jack plane, (*b*) jointer plane, (*c*) block plane, (*d*) router plane.

7. The waterproof glue commonly used today is known as: (*a*) an animal glue, (*b*) a liquid glue, (*c*) a vegetable glue, (*d*) a plastic resin glue.

8. Wood filler is quite essential in finishing:

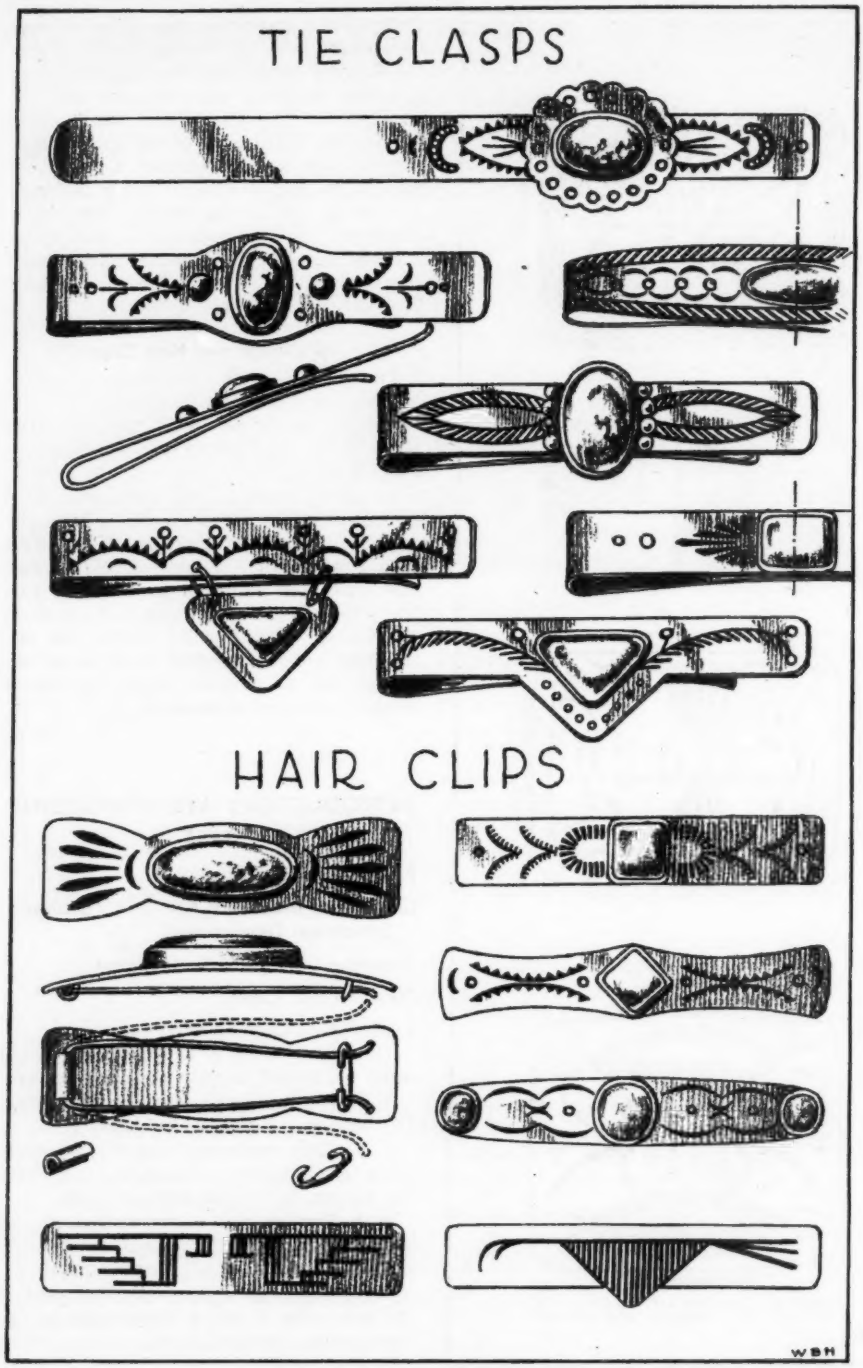

Plate 21. See also Plate 20 on previous page

(*a*) oak, (*b*) maple, (*c*) poplar, (*d*) basswood.

9. When gluing together the edges of boards, the least durable joint is the: (*a*) tongue and groove joint, (*b*) butt joint, (*c*) rabbet joint, (*d*) dowel joint.

10. The bit most frequently used in the woodworking shop is the: (*a*) Forstner bit, (*b*) gimlet bit, (*c*) expansive bit, (*d*) auger bit.

II. *Fill-in and Completion Exercises* (20 points)

Directions: Supply the words which are needed to make correct statements.

1. The .... bit is used to shape the outer edge of a hole so that the head of a large screw can be seated flush with the surface of a board.

2. Planing the .... of a board is the first step in the "four-step" squaring process.

3. When two boards are cut so as to fit over each other at right angles, and on the same plane, the fitting is known as a .... joint.

4. The attachment used in boring holes to a specific depth is known as a ..... .

5. Rigid shelves in a bookcase are usually attached to the sides by a .... joint.

6. The process of gluing a thin decorative sheet of wood over a board or *core* is known as ..... .

7. The cut made along the inner edge at the back of a picture frame, into which the edges of the picture and glass fit, is called a .... .

8. Wedges are frequently driven into .... joints to make them more secure.

9. Small blocks of wood should never be cut to length against the .... of a circular saw.

10. The teeth of a saw are set so that they cut a .... which is slightly wider than the thickness of the saw.

III. *Selection Exercises* (20 points)

Directions: Three of the items in each of the following lines have something in common. Draw a line under the one which does not belong to the ***family***.

1. Chisel, knife, plane blade, spokeshave blade.
2. Walnut, oak, white pine, maple.
3. Paint, brush, shellac, varnish.
4. Rotten stone, 3/0 steel wool, 6/0 sandpaper, file.
5. Pliers, parting tool, skew, round nose.
6. Band saw, coping saw, backsaw, jig saw.
7. Dividers, spokeshave, marking gauge, scratch awl.
8. Expansive bit, hand screw, bar clamp, vise.
9. Flathead, roundhead, Phillips, gimlet.
10. Lag, common wire, finishing, cut.

IV. *True–False Exercises* (20 points)

Directions: Use the letter *T* to indicate statements which are true and the letter *F* to indicate those which are false.

.... 1. The jointer is regarded as one of the safest machines in the woodworking shop.

.... 2. The course in woodworking should be sufficiently flexible so as to meet the interests, needs, and abilities of individual students.

.... 3. Finishing wax should be colored so as to match the shade of individual finishes.

.... 4. The escutcheon pin is a small nail with a square head.

.... 5. The rasp is used to prepare the edge of a board so that it will be ready for finishing.

.... 6. In plywood, the grain of each layer runs crosswise to the grain of its adjoining layers.

.... 7. Manufacturers produce a plane known as a circular plane.

.... 8. In cutting mortises with hand tools, the bulk of the stock is removed with the brace and bit.

.... 9. The expansion and contraction of

wood is caused by variations in the temperature.

.... 10. Rayon and cellophane are produced from wood.

V. *Matching Exercises* (20 points)

Directions: Each item in the left-hand column is associated with one in the right-hand column. Place the number in the blank so as to indicate which ones go together.

Section A

1. End grain	....	spline
2. Chisel	....	oak
3. Wood filler	....	clamp
4. Try square	....	peg leg
5. Half-round	....	mallet
6. Miter	....	groove
7. Spirit	....	block plane
8. Carriage	....	file
9. Tongue	....	ninety degrees
10. Boring jig	....	level

Section B

1. Lathe	....	graph paper
2. Burnisher	....	butt
3. Crosscut feed	....	oil stain
4. Template	....	cabinet scraper
5. Oiled rags	....	bit
6. Turpentine	....	circular saw
7. Grinder	....	calipers
8. Hinge	....	peg
9. Brace	....	eye *protectors*
10. Dowel	....	spontaneous combustion

KEY TO TEST IN INTRODUCTORY WOODWORKING

I	II	III
1. c	1. countersink	1. knife
2. d	2. edge	2. white pine
3. c	3. lap	3. brush
4. a	4. depth gauge	4. file
5. c	5. dado	5. pliers
6. b	6. veneering	6. backsaw
7. d	7. rabbet	7. spokeshave
8. a	8. mortise-and-tenon	8. expansive bit
9. b	9. ripping fence	9. gimlet
10. d	10. kerf	10. lag

IV		V	
	A.		B.
1. F		6	4
2. T		3	8
3. T		8	6
4. F		10	2
5. F		2	9
6. T		9	3
7. T		1	1
8. T		5	10
9. F		4	7
10. T		7	5

PERSPECTIVE DRAWING TEACHING AID

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Teaching perspective drawing has long been a problem of concern to a great many drawing teachers, and a great deal of patience has been expended in trying to have the student grasp the underlying ideas involved. In the light of these facts, the teaching aid described herewith, has been developed to enable the student to visualize better some of the basic ideas underlying this work.

Since perspective drawing is closely related to the architectural drawing field, a model house (1) was chosen as the object to be viewed. See Figure 1. This house is mounted at the end of a wooden base (6), at the other end of which is mounted the peephole viewer (2). This is the station point from which the student looks to view the house. Mounted on the long base is the cross base, or plane base (5). It is called a plane base because it is here that the vertical plane is set up between the viewer (station point) and the model house. This plane base is made so that it can be moved along the main base toward or away from the model to vary the projection results. The vertical plane in this instance consists of a piece of transparent Plexiglas mounted between two supports. In the one adaptation of the teaching aid, a series of threads are run from the viewer through definite holes in the Plexiglas, and running back to the main points on the house to represent lines of projection. These lines simulate lines of sight from a definite focal point to the points on the model.

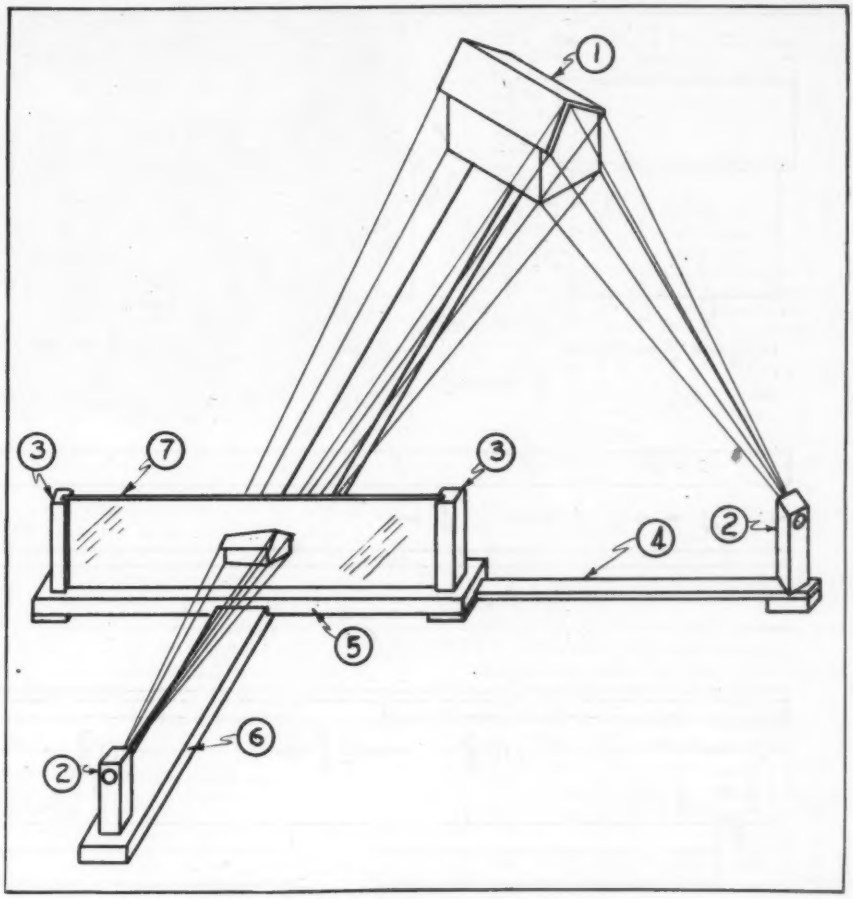


Fig. 1. Perspective teaching aid

To further increase the use of the aid, an auxiliary arm (4), is used which fits into a slot cut in the plane base. This arm is adjustable and can be lengthened or shortened by moving it in or out of the slot in the plane base. Attached to this arm is another viewer, which may merely be a small dowel pin to illustrate a vanishing point, to the right or left as the case may be in setting up the equipment. Also to make this vanishing point more clearly seen, a series of threads are run from the vanishing point to the main points on the house: here again showing the effect of diminishing size in approach of the vanishing point.

To further show this effect, a paper silhouette of the house is made so that it will fit snugly between the peak point line, and the base-of-the-house line. This silhouette should follow the lines of sight set up by the threads.

In another adaptation of the teaching aid, the vertical plane with the threads running through it is removed along with all the threads. In its place is inserted a clear piece of Plexiglas free of any holes or threads. The new vertical piece will afford a place on which to draw the image that is seen through the viewer.

Using the Device or Aid

There are three major adaptations to this teaching aid, and these can each be done in a minimum of time with only slight alterations in the equipment.

The first arrangement is to get the vertical plane in the supports that have the threads running through it. Attach the threads to

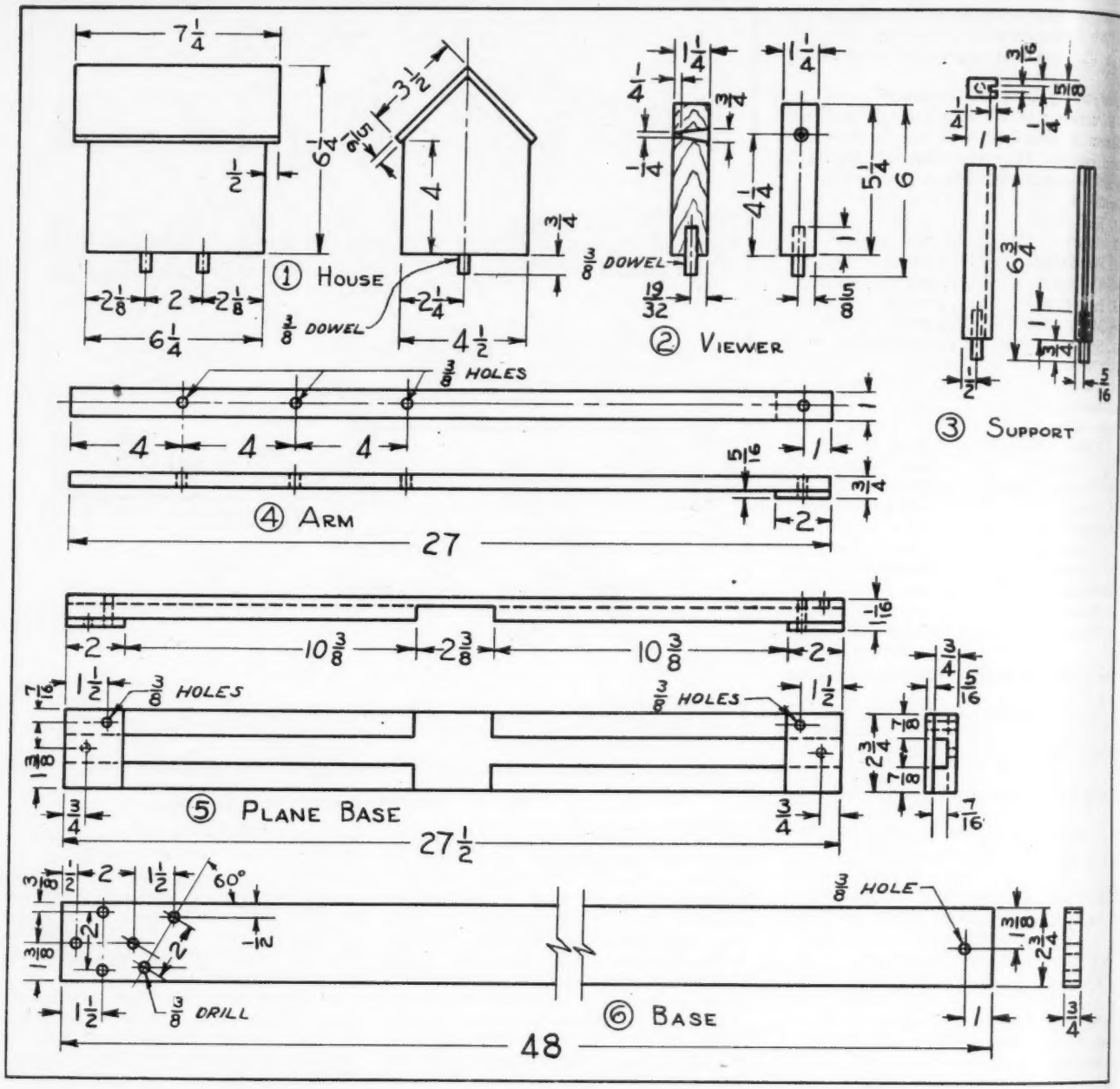


Fig. 2. Details of perspective teaching aid

their proper positions on the house, and then make the other end secure to the viewer. The vertical plane should be in such a position on the base that all the lines will be straight and direct. With the equipment set up in this way:

I. The instructor should draw lines on the Plexiglas between the holes pierced by the threads, thus making a picture of the house as the lines of sight pass through the plane.

A. These lines should be heavy enough and accurate to the extent that the student will be able to see the relationship of size, and the effect of the receding lines.

II. The instructor should point out that this focusing of all lines to one point is what is known as one-point perspective.

III. The instructor should also point out that there is a variation of effect when raising or lowering focal station or points.

A. Show the effect on receding lines of the house.

With the equipment still set up and the threads running through the vertical plane, attach the adjustable arm to the plane base. Put the second viewer or vanishing point in place on the arm.

I. Let the students see the effect as the arm is moved in and out of the plane base.

II. Explain that the viewer is at this position comparable to a vanishing point for the projected image.

III. Attach the threads from the main points of the house to the vanishing point.

A. Illustrate the idea to the students in using the threads how the house image will taper toward the vanishing point, and gradually get smaller and smaller.

B. Put paper silhouette between the lines in its proper position.

1. Show the students the uniformity of tapering toward a given point.
2. Indicate that length as well as height will gradually decrease and diminish.

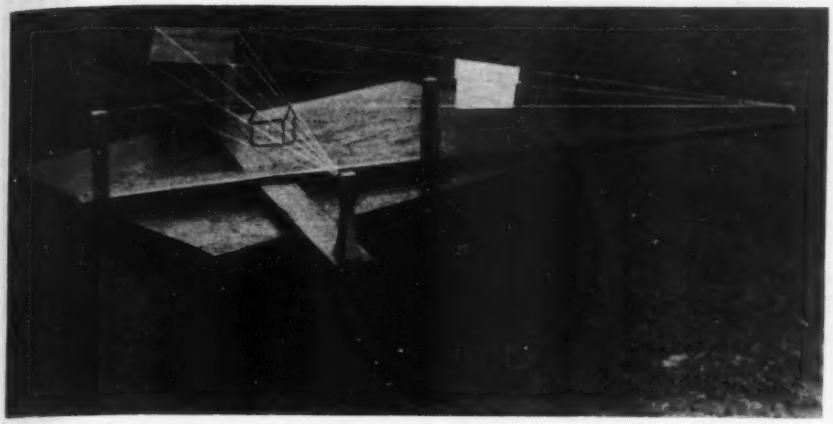


Fig. 3. The perspective teaching aid in use

The third major adaptation of this equipment does not require the use of any of the threaded lines, and they should be removed. Place the second piece of Plexiglas in the vertical plane. Since this plane has no holes or threads in it, it is possible to write and draw on it.

I. Have the student look through from the point of station and draw on the vertical plane what he sees as to the image of the house.

II. Have the student draw the image on the vertical plane three times with the vertical plane being located toward or away from the model at different spots along the base.

III. Compare the three images, and show the students the significance of the three different sizes in images drawn.

Construction Features

It will be noticed that the teaching aid is made up of about ten separate parts plus the thread. Most of the parts fit together by the use of 3/8-in. dowels. The device is made so that it may be disassembled to facilitate storage and transporting. The long base has a series of 3/8-in. holes at the end of it arranged in such a manner that the house may be located on the base at several different angles. The long adjustable arm may be locked to the plane base by inserting a dowel pin in the matching holes. All sliding joints should be made as accurately as possible to insure a good fit and a minimum of shake in the parts. Follow the details closely to get size and shape proportions.

When using the threads, they are tied together just as they enter the hole in the viewer. A constant tension is kept on the lines by the use of rubber-band attachment. The thread used should be white or some color that is easily seen. Very small brads are used as points to hook the thread on the house. The threads pass through the Plexiglas vertical plane by means of a series of very fine holes accurately located and drilled.

To add color and interest to the project, a painted finish is put on the project. An appropriate color scheme should be worked out. The house roof should be of different color than the main portion of the house. The bases should be the same color, with the viewers and supports painted a similar or matching color. Avoid drab colors.

This teaching aid should prove very interesting as well as helpful in the drawing room. The student should be permitted, if conditions warrant, to handle the device, setting it up, adjusting it, and experimenting with it.

BILL OF MATERIALS

Part No.	*No. Req'd.*	*Name*	*Material*	*Size*
1	1	House	Wood	4½ x 6¼ x 6¼
2	2	Viewer	Wood	1¼ x 1¼ x 5¼
3	2	Support	Wood	¾ x 1 x 5
4	1	Adjustable arm	Wood	¾ x 1 x 27
5	1	Plane base	Wood	¾ x 2¾ x 27
6	1	Base	Wood	¾ x 2¾ x 48
7	2	Plane	Plexiglas	⅛ x 6 x 24
	1	Spool	Heavy white thread	
	7	Dowel pin	Birch	⅜ x 2

A SIMPLIFIED COURSE OF ELEMENTARY ELECTRICITY

VINCENT P. CONNERS
Instructor, Manual and Industrial Arts
Boston Teachers' College
Dorchester, Mass.

Small inexpensive units such as this one may be set up from even the most limited school budgets, maintained for very little and expanded as the teacher or instructor feels the need. It may be used with classes of retarded children, hobby groups, club periods, exploratory courses, or as a part of a general home-mechanics unit.

The following is a list of materials necessary. These materials add up to $17.75 and, of course, will be less with school discount:

1	three-way switch	$ .45
4	dry cell batteries @ .50	2.00
1	cutout block	.40
4	Hubbel plugs	.40
1	lamp cord	.50
1	transformer (for testing)	1.00
	bell wire (3 rolls @ .80 a roll)	2.40
	staples	1.00
6	bells @ .60	3.60
6	buttons	.90
4	buzzers	1.80
4	switch boxes	1.00
2	single-pole switches	.40
2	gross No. 8 by 1-in. r.h. screws	.70
2	gross No. 8 by 1½-in. r.h. screws	.80
1	gross No. 8 by 2-in. f.h. screws	.40

10 electrical wiring boards, approximately 24 by 36 in., for mounting bell wiring jobs. These may be made by the industrial-arts department. The few tools — pliers, screw drivers, hammers, etc., I assume you have.

The following is the list of suggested steps or units.

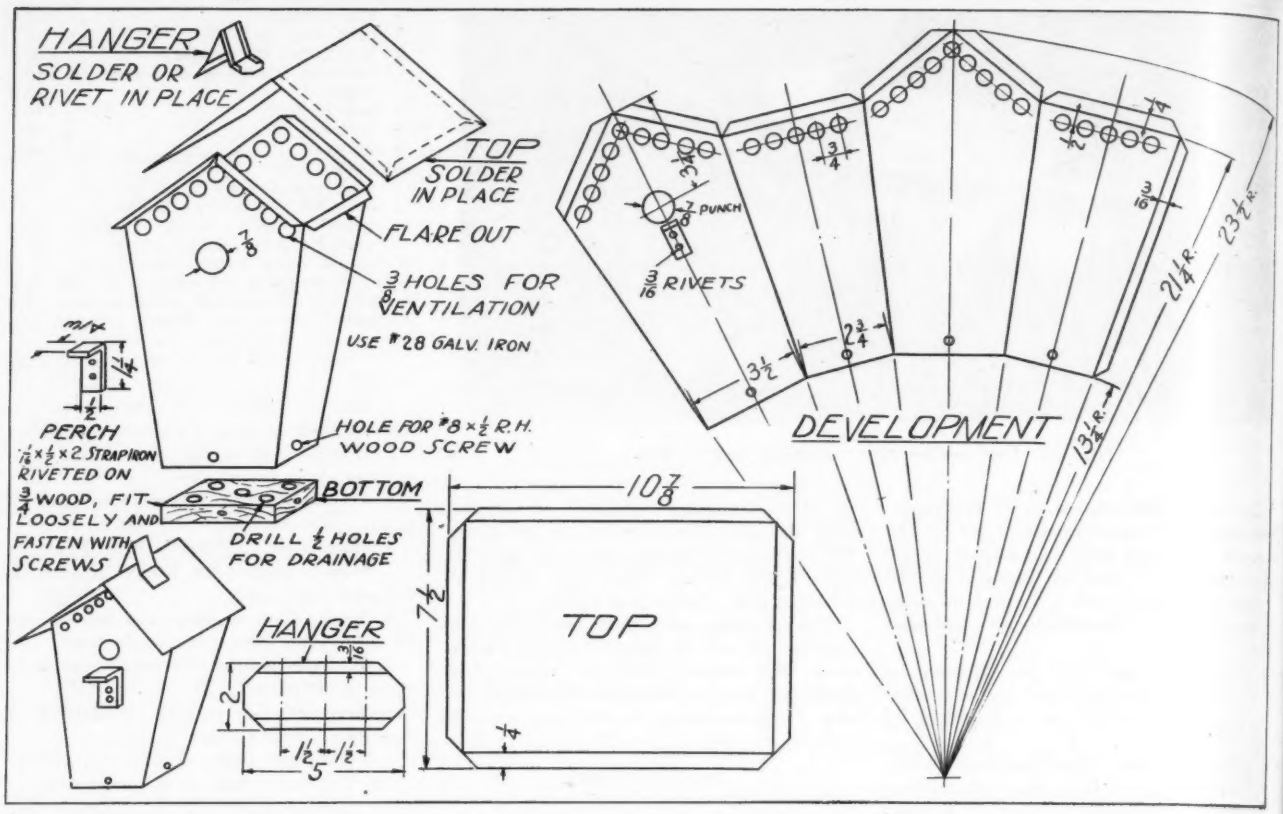
1. Electric circuit (the explanation and demonstration of what a complete circuit is).
2. How to label all shutoffs and fuse boxes at home.
3. Learning to make the common electrical splices (Western Union, tap, pigtail, etc.).
4. How to tie the Underwriter's Knot.
5. How to replace the Hubbel plug on the end of a lamp cord.
6. Replacement of fuses and how to shut off entire home current in a single room.
7. Batteries in series (the method for the increasing of voltage).
8. Batteries in parallel (increasing of strength — these will last longer).
9. Christmas lights — series and parallel.
10. Bell transformer as a testing unit.
11. How to replace wornout single-pole light switch.
12. How to replace a 3-way switch.
13. Painting of outside lights (to stop the staining of the house).
14. One bell — one button.
15. Two bells in series — one button.
16. Two bells in multiple — one button.
17. Two bells in multiple — two buttons in multiple.
18. Front door button connected to bell in hall, with battery in cellar.
19. Front and rear doors — by separate ring.
20. Upstairs and downstairs buzzers, both by same button.
21. Bell circuit, two buttons, one for bell, one for buzzer, both using same battery.
22. Bell circuit — bells and buzzers for front and rear doors of a two-family house.

It is easy to see that this same outlay of money can provide a purposeful unit to encourage and stimulate the hands and minds of those with whom we have a daily contact.

SHEET METAL WREN HOUSE

J. H. HOPPER
Rowe High School
Conneaut, Ohio

It is sometimes difficult to find sheet-metal jobs which have not only the "boy appeal" and the problem solving factors necessary for a good school shop job but also can be constructed with simple equipment. The wren house shown and described herewith meets all of these requirements.



Sheet metal wren house

Procedure

1. Study the instructions and illustrations carefully.
2. Develop full-size patterns on paper.
3. Fasten the paper patterns on the stock with cellulose tape.
4. Transfer patterns to metal by light prick punch marks on all corners, bending lines, and hole centers.
5. Remove paper and scribe all lines on the metal.
6. Cut the material for all pieces.
7. Drill or punch holes. It may be necessary to cut out the entrance with hawk's bill tin snips.
8. Remove all burrs and sharp edges with round file.
9. Make perch and drill or punch holes for 3/16-in. iron rivets.
10. Rivet perch in place with heads outside. If a lead block is used on the anvil the rivet heads will not be flattened.
11. Bend the four sides and lap seam of the birdhouse in the brake or between angle irons held in the vise.
12. Solder seam.
13. Flare out the hems at the top. Test on a flat surface. This job must be done carefully if the top is to fit properly.
14. Fold hems on top.
15. Shape top to fit body with hems down.
16. Fold hems on hanger.
17. Shape hanger to fit top and solder or rivet in place.
18. Solder top in place.
19. Remove excess acid to prevent corrosion.
20. Remove excess solder.
21. Construct bottom of ¾-in. softwood. The bottom should fit loosely to facilitate cleaning.
22. Lay out the diagonals on the bottom and bore the five ½-in. holes for drainage.
23. Fasten the bottom in place with No. 8 by ½-in. r.h. wood screws. These screws should not be turned in too tightly or the pressure will distort the metal.
24. Finish with one or two coats of good enamel.
25. When the finish is dry, hang the wren house in a suitable place out of reach of the neighborhood cats and wait for the cheerful little songsters to move in.

ELEMENTARY AUTO MECHANICS

FRANK B. MILLER
Central High School
Tulsa, Oklahoma

The directions given in this article are for beginners starting auto-mechanics shopwork. They are to be used in connection with a set of job sheets prepared for directing work on the equipment at hand.

The job sheets are mounted on their respective motors or other units of equipment, and are in mimeographed form for frequent replacement as the boys change jobs. A column is provided in front of the steps of the job sheets for checking off completed stops, thus enabling succeeding classes to continue work on the same motor. The individual boy secures a complete range of experiences by working on a number of different motors during the semester. The extent of work on a given motor, as controlled by the job sheet, varies with the purpose of that motor and the experience of the boy.

Assignment Sheet No. 1 — Locating Equipment and Materials

Purpose: In order to make an intelligent use of the shop and its equipment, it is necessary to know the location of each item. A planned study of this problem will enable you to take full advantage of the opportunities of the shop from the first day.

Procedure:

1. Secure from the foreman a prepared floor plan blank showing the numbered outlines of all equipment, each piece in its proper place.
2. Study this plan, and list on a separate sheet the various items by name and number. This list should include the following:

Cleaning table	Toolroom
Kerosene barrel	Drill
Sixteen motors	Grinder
Electric outlets	Hoist
Battery charger	Desk

Valve machine	Sink
Welding bench	Press
Wall benches	Shop room chart
Steel locker	

3. Make a second list, stating briefly where the following may be secured or are kept: (NOTE: If locked up, the answer is "Foreman.")

Tools	Gasoline cans
Hardware	Oilcans
Motor ignition parts	Floor pads
Parts removed from motors	"Safety" rag can
	Waste oil barrel
Extra soap	Batteries
Extra towels	Dustpan
Clean rags	Bench brushes
Tin pans	All motor gaskets

4. Hand in diagram and two lists.

Questions:

1. Do you have this information sufficiently fixed in mind to pass a daily examination on it?

Reference:

1. The chief source of this material is by observation with the instructor and foremen to help.

Assignment Sheet No. 2 — Learning Names and Uses of Tools

Purpose: In order to do the job in the correct and usually the easiest and safest way, it is necessary to know the correct tool to use. In order to get that tool from the toolman, it is necessary to know the name, size, and any other identifying marks.

Procedure:

1. Check out special tool identity panel No. 1.
2. Study the different wrenches as to:
   a) Kind — speed socket, box socket, end, etc.
   b) Marked size. (Ask if unmarked.)
3. List these tools by their number, and give correct name and size. Turn in list to foreman.

NOTE: Panel No. 1 contains one each of the following wrenches:

Plain socket	Plain end
Box socket	Tappet
Separate socket	Ignition
Socket set handle	Pipe
T flex socket	Crescent
Speed socket	

4. Repeat steps 1, 2, and 3 for tool identity panel No. 2 of the following:

Ball-peen hammer	Cold chisel
Cross-peen hammer	Center punch
Blacksmith hammer	Tapered punch
Softface hammer	

5. Repeat for tool identity panel No. 3 of the following:

Standard screw driver	Round file
	Half round file
Machinist's screw driver	Square file
	Three cornered file
Hack saw	File card
Flat file	

6. Repeat for tool identity panel No. 4:

Ring compressor sleeve and handle	Overhead valve spring compressor
Stephen ring compressor	Wire scratch brush
	Putty knife
Universal valve spring lifter	Wide scraping knife
	Valve lapping tools (2)
Heavy duty valve spring lifter	

References:

Bonny, National, Stanley, K-D, and Sioux Tool Catalogues.

Assignment Sheet No. 3 — Learning Common Tool Processes and Jobs

Purpose: Actual work on motors calls for a knowledge of the use of common tools. While most of the practice with tools will come when you are working on motors, a little knowledge gained ahead of time will be a big help.

Procedure:

I. Review the following jobs and study any you do not already understand.

A. *How to remove stud bolts without damaging the threads:*
   1. Jam two nuts tightly together on the threaded end of the stud.
   2. Unscrew the stud by means of a wrench on the inside nut.

B. *How to use hack saw correctly:*
   1. Place stock being cut in the position which makes possible contact with the greatest number of saw teeth at one time.
   2. Hold saw steady and use *long* steady strokes.
   3. Use only a light pressure on the forward stroke.
   4. Cut clear through the stock — do not break off the last part as this usually bends the stock and leaves a rough end.

C. *How to use a flat file correctly:*
   1. Select the right size file and grade of teeth.
   2. Hold stock firmly in vise.
   3. Take long steady strokes.
   4. Clean file frequently with file card.
   5. Hold file on bench and rub part on it where an absolutely flat surface is desired (only possible where surface being filed is smaller than file itself).

D. *How to use a grinder correctly:*
   1. See that eye shield and tool rest are in place.
   2. Never hold work slanting downward as this usually results in piece and sometimes finger being pulled down between stone and guard and breaking the stone.
   3. Hold chisels, punches, and pointed tools slanting upward against the stone, rotating round points.
   4. Never have lose strings or rags near the stone. They are apt to get tangled in the machine or pull your hand against the stone.
   5. Keep work shifting across stone face so as to keep stone square.
   6. Dip piece in water frequently to keep cool.

E. *How to use a hoist:*
   1. Be sure the chain is securely fastened to the motor to be lifted.
   2. Have instructor check fastening and unlock hoist.
   3. See that everyone is clear before starting to lift.
   4. Operate hoist *slowly* and keep fingers away from all pulleys.

II. Hand in answers to questions at end of this sheet.

Questions:

1. Why not remove stud bolts with a pipe wrench?
2. Why keep as many hack saw teeth as possible constantly against the stock being cut?
3. What would result from pressing too heavily on the hack saw?
4. Why clean out a file?
5. Why should the face of a grind stone be kept square?
6. Why operate a hoist slowly?

Assignment Sheet No. 4 — Learning Correct Shop Procedure

Purpose: In order for each member of a large group to use a shop efficiently, it is necessary that everyone be familiar with the routine of shop order.

Procedure:

1. List the names of the following bulletin boards, and place under each of the names the *title* of the items found on the respective boards:
   South bulletin board
   West general bulletin board
   East general bulletin board
   East (your) period bulletin board
   Toolroom door
   Desk bulletin board
2. Write down the *title* of the division foremen jobs.
3. Write down the grade points of the tool checkers.
4. Copy the following four items to be checked in leaving a motor at the end of the period:
   Are all parts *under* the motor?
   Are all rags put in a rag can?
   Are all tools checked in and floor pads put away?
   Are all ignition parts and batteries put away?
5. Hand in these four lists to the foreman.

Questions:

1. Give three reasons for keeping a shop clean.
2. Give two reasons for keeping shop equipment in order.

Assignment Sheet No. 5 — Learning Descriptions of Common Hardware and Supplies

Purpose: In order to know what kind or size bolt you need and to be able to ask for it, you must know how to describe it properly.

Procedure:

1. Check out the special hardware identity

panel and study the various items as to kind, size, thread, grade, etc.

NOTE: This panel contains the following items: 2 N.F. hex. head cap screws of different sizes, 2 N.F. plain hex. nuts of different sizes, N.F. Castellated hex. nut, 2 N.C. hex, head cap screws of different sizes, N.C. plain hex. nut, lock washer, plain washer, stove bolt and nut, spark plug, 2 high tension ignition wires, low tension ignition wire, shim, connecting rod bolt, 2 sizes of cotter keys, roundhead rivet.

Questions:

1. What are the two common threads used on automobile hardware?
2. Give one advantage of each type of thread.
3. What is the purpose of a castellated nut? Is it used on an ordinary bolt?

References:

Hardware catalogues

(To be continued)

SHOESHINE BOX

LOUIS BAROCCI
High School
Cudahy, Wis.

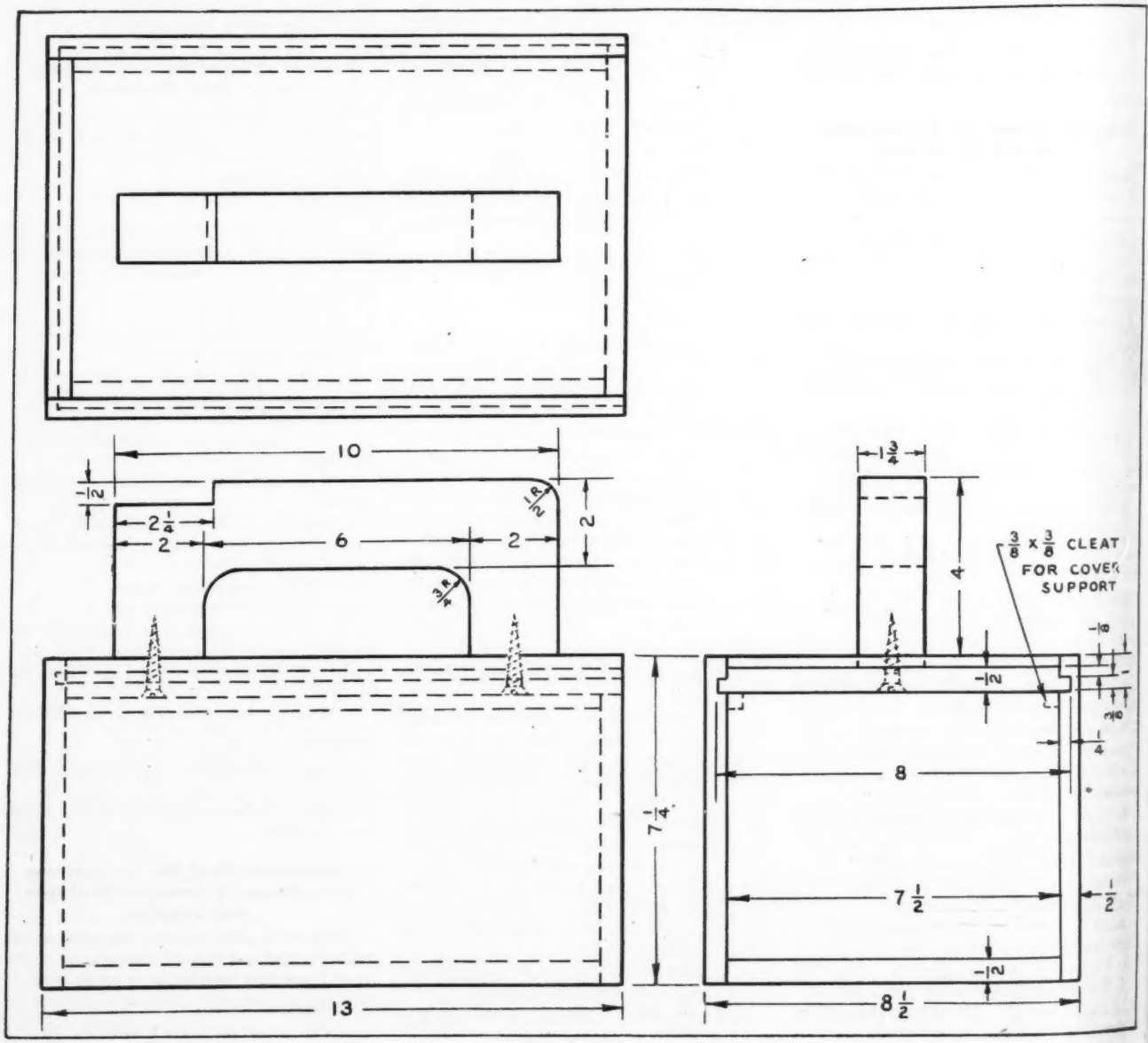
The shine box illustrated has student appeal and is not too difficult for some of the beginning high school woodshop students. The footrest also serves as a handle to open and close the box and to carry it about. When the construction work is done the box is either painted or varnished depending on the type of wood used.

FLY TYING VISE

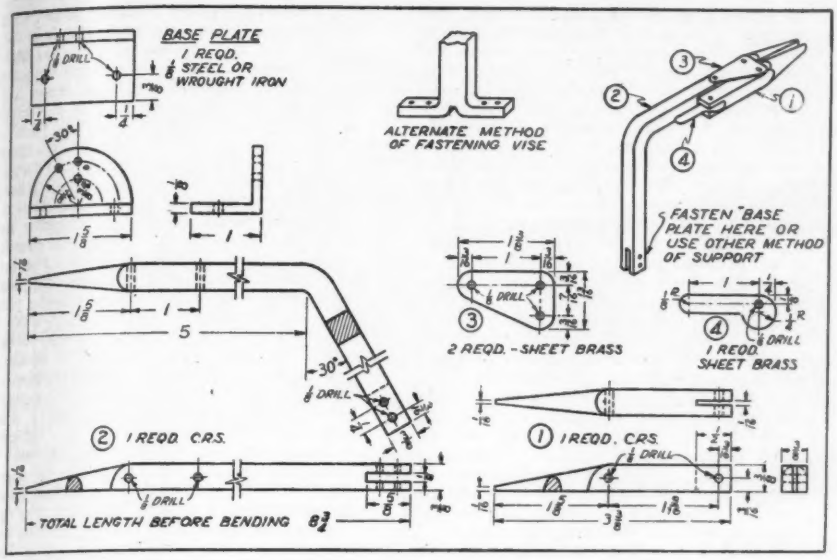
REESE POWELL
Industrial-Arts Instructor
Technical High School
Scranton, Pa.

The fly tying vise is an interesting and practical project for tenth- or eleventh-grade boys in a general shop, especially those interested in fishing and fly tying. Making the vise involves operations in bending, filing, drilling, and riveting. Roundhead ⅜ by ½-in. rivets are used in assembling the parts. If rivets are not available use pieces of ⅜-in. welding rod, cut to size, and peened at both ends. The slotted part of the jaw fits on the base plate, which may be fastened to the bench top with small wood screws. The plate can be made of ⅛-in. steel or wrought iron. All five holes are drilled ⅛ in. in diameter, the center hold in the curved upright piece being the pivot hole and the two that are 30 deg. apart, are for two different positions of the vise. More holes may be drilled on the ⅝-in. arc to get a variety of positions, but the two shown are satisfactory for most users. The vise is held in position on the base plate with ⅜-in. bolts and nuts.

Other methods can be employed in holding



Shoeshine box



Details of fly tying vise

the vise while being used, such as fastening it to the end of a workbench with screws in the position desired; putting it in a bench vise; or bending out the slotted ends at right angles to the upright and fastening to a bench top with screws, as shown.

The finished vise, with its base, can be attached to a workbench or to a table for tying flies.

Personal News

♦ Dr. Homer J. Smith, Professor of Industrial Education, University of Minnesota, Minneapolis, Minn., has been granted a leave of absence for the spring quarter to act as consultant on industrial education, under the War Department, in the U. S. Zone of Germany. He will travel by plane to Berlin about the middle of March and will again be back at the University for the summer session.

♦ Professor Ammon Swope was named secretary to replace Prof. Dennis H. Price during his leave with the Republic of Panama.

♦ Russell Adams, of Gary, Ind., is undertaking the preparation of individual instruction material for a number of building trades in his city. It is his purpose to assist the teacher to write individual instruction sheets on assignments suggested by the apprentice curriculum committee, modified by material from other sources as well.

♦ Dr. John T. Rettaliata, director of the department of mechanical engineering at Illinois Institute of Technology, Chicago, Ill., will become dean of engineering next September 1.

He will fill the position vacated by James C. Peebles in August after more than 40 years of service at the technological institute.

At 36, Dr. Rettaliata is one of the youngest deans of engineering in the United States. A leading mechanical engineer and steam and gas turbine expert, he has headed the department at Illinois Tech since 1945.

♦ With the addition of a new supervisor, the Los Angeles city schools now have complete industrial-arts supervisory staff, for the first time.

Supervisors of elementary industrial arts: John Giovannoni, formerly instructor, Dorsey High School, Los Angeles; John Marbut, formerly instructor, Gorman Avenue School, Los Angeles; Wayne Wonacott, formerly instructor, Hollenbeck Jr. High School, Los Angeles.

Supervisor of junior high school industrial arts: Lyman Goldsmith, formerly elementary industrial-arts supervisor.

Supervisor of senior high school industrial arts: Virgil Volla.

♦ Raymond D. Meade has been named registrar and associate professor of education at Illinois Institute of Technology, Chicago, Ill.

The appointment is effective March 1.

A native of Princeton, Ind., Meade received a certificate from the Universite' de Toulouse, France, in 1919, a bachelor's degree from the University of Oklahoma in 1923, and a master's degree from the University of Chicago in 1933.

♦ Professor Pearce Davis has been appointed director of the department of industrial engineering at the Illinois Institute of Technology, Chicago, Ill. He also will continue as chairman of the department of business and economics.

♦ Clyde R. Snyder of Detroit has recently been appointed to the industrial-education faculty at Western Michigan College at Kalamazoo, Mich., to teach air conditioning and refrigeration.

He succeeds Devere Curran, who has recently accepted a position as co-ordinator in trade and industrial education in the Bay City, Mich., public schools.

♦ J. V. Melton, formerly of Louisiana State University, has joined the industrial-education staff at the State Teachers' College, Pittsburg, Kans. Dr. Melton was graduated from the University of Missouri and during the war served as an officer in the navy.

♦ Gordon O. Johnson, teacher of building trades at Herculaneum, Mo., is giving his boys some real experience in construction work. They have constructed a series of buildings for the public schools. Mr. Johnson received his master's degree from the University of Missouri at the close of the 1947 summer session.

♦ Ted Lazarz, a 1947 graduate of Purdue, is now teaching in Columbia City, Ind. He has charge of vocational machine shop and expects to do some work in co-ordination.

♦ Harold Bowman, formerly teaching at New Haven, Ind., is now in charge of the general shop program at Columbia City, Ind.

♦ Max Michaels, formerly of Chesterton, Ind., and a graduate of Ball State Teachers College, is teaching vocational machine shop at Hartford City.

♦ Theodore Kuemmerlein has been appointed supervisor of guidance for Milwaukee Public Schools, Milwaukee, Wis.

♦ Cecil Cox has been appointed assistant professor of art and industrial arts, Ball State Teachers College, Muncie, Ind.

♦ William Sellon is instructor of welding and machine shop at Oklahoma University, Norman, Okla.

♦ Cecil R. Hutchcroft has been appointed professor of industrial-arts education at State Teachers College, Oswego, N. Y.

♦ Harold Gilbert is instructor of general metals at State Teachers College, Oswego, N. Y.

♦ Ralph Rogers is instructor of machine shop at Indiana Technical College, Fort Wayne, Ind.

♦ Virginia M. Smith has been appointed co-ordinator of distributive education for the Covington, Ky., public schools.

♦ Albert Ackley, Ovid, Mich.; W. A. Boerner, Bellaire, Mich.; Waldo Proctor, Walled Lake, Mich.; Claude Shufelt, Morence, Mich.; and J. A. Converse, Alpena, Mich., will be awarded twenty-year service keys when the Michigan teachers of vocational agriculture hold their annual meeting in Grand Rapids, Mich., in May.

♦ Robert Zenor is teaching mechanical drawing in the Columbus City Schools, Columbus, Ind.

♦ L. A. Holloway, Graymont, Ga., completed the work for his master's degree in industrial education at the University of Missouri during the 1947 summer session and is now instructor of industrial arts in the high school at Albany, Ga.

♦ Charles G. Risher, of Newcomerstown, Ohio, is employed part time in the Engineering College of the University of Missouri where he is doing graduate work in industrial education. Mr. Risher received his bachelor's degree from the Bowling Green State University, Bowling Green, Ohio.

♦ George W. Senteney, a graduate of the Southern Illinois University, is now a part-time instructor in the Engineering College of the University of Missouri and a graduate student in industrial education at that institution.

♦ Ah Chong Zane of Kohala, Hawaii, and Kitoku Ishiguro of Kalaheo, Hawaii, have returned to their native land to teach industrial arts. Both Mr. Zane and Mr. Ishiguro are graduates of the Santa Barbara State College of the University of California and the Graduate School of the University of Missouri.

♦ Charles W. McIntosh of Emporia, Kans., received his master's degree from the University of Missouri in June, 1947, and is now a member of the industrial-arts staff at Memphis State College, Memphis, Tenn.

♦ Clarence W. Ridgeway recently has been appointed supervisor and head of the industrial-arts department in the high school at Millburn, N. J.

Mr. Ridgeway is a graduate of Oswego State Normal School in June, 1927. He received his B.S. from Newark State Teachers College, Newark, N. J., and is a member of Kappa Kappa Kappa and Epsilon Pi Tau honor fraternity. He has taught for two years in Uniontown, Pa., nine years in Roselle, N. J., and one year in Camden, N. J. He is now teaching mechanical and engineering drawing in the high school at Millburn, N. J.

Association News

A.V.A. CONVENTION REPORT

(Continued from page 54A of the March, 1948, issue)

Safety

Wayne P. Hughes, director, School and College Division, National Safety Council, Chicago, Ill., was the chairman of the session on safety at the Thursday morning meeting.

"Safety for the School Shop" was discussed by A. C. Blackman, San Francisco, Calif., and "In-

dustrial Safety Training" by Lester E. Ecke, Sacramento, Calif.

DeWitt Hunt, Stillwater, Okla., spoke on "New Trends in School Shop Safety," and Roy R. Van Duzee, West Allis, Wis., spoke on "What Constitutes a Good Safety Education Program in Trade and Industrial Education."

"Apprenticeship Education" was discussed by a panel consisting of William F. Patterson, Washington, D. C., assisted by Archie J. Mooney, San Francisco, Calif.; E. C. Hinckley, Pittsburgh, Calif.; J. F. Ingram, Montgomery, Ala.; John H. Hill, Bridgeport, Conn.; J. H. Stephenson, San Diego, Calif.; Lloyd A. Mashburn, Los Angeles, Calif.; and Irvin De Shetler, Los Angeles, Calif.

Vocational Guidance

"Vocational Guidance" was discussed by a panel at a meeting on Tuesday morning at which Dolph Camp, state supervisor, Occupational Information and Guidance, State Department of Education, Little Rock, Ark., presided. Other panel discussions on this subject took place Tuesday and Wednesday afternoon.

C. L. Grieber, A.V.A. past president, and state director of vocational and adult education, Madison, Wis.; and Emery Stoops, administrative assistant, County of Los Angeles Board of Education, Los Angeles, Calif., presided at these two last sessions.

W. E. Smith, assistant chief, State Bureau of Vocational Rehabilitation, Sacramento, Calif., presided at the vocational rehabilitation session held on Tuesday afternoon.

The House of Delegates met Thursday afternoon, with Florence Fallgatter, president, in the chair.

The resolutions committee, through John J. Seidel, its chairman, presented the following:

Your resolutions committee has adopted a form which presents statements of basic policies which, if approved, will constitute a platform for vocational education in the United States and in the several territories.

1. *Philosophy of Vocational Education.* Your committee reaffirms the belief that the basic concept of all vocational education programs should be to assist in-school youth and out-of-school youth and adults to develop economic independence. Economic independence of the individual is the vital cornerstone of a growing democracy. Vocational education programs should be an important part of all education and therefore should include a complete understanding of the social, economic, and aesthetic environment, as well as those understandings for work. This belief assumes that education for complete living on all levels of schooling should be designed for all the youth of all the people.

2. *Democratic Procedure of Program Planning.* The postwar occupation adjustment and the veterans occupation training programs make it imperative that we continue to have aggressive and effective national, state and local leadership. Such leadership has been the very foundation of the ever growing, flexible, vocational education movement since the passage of the Smith-Hughes Act. Since state and local needs and economic conditions vary throughout the nation, and in order that there may be a thorough understanding of these conditions, it is strongly recommended that state and local administrators, supervisors, and teachers of both general and vocational education be invited to participate in planning and developing all programs of vocational education. Furthermore it is for all practical purposes a necessity that local leaders of employing groups and of labor in the fields of agriculture, homemaking, business education, and industry be invited to share the responsibility in developing policies and principles for state and local vocational education programs.

3. *Vocational Education for Veterans.* In the vocational training of veterans the vocational education forces have been called upon again to render a service on a national scale. Any program with such a comprehensive training service, of such magnitude and volume and scope would naturally have difficulties and misunderstandings in its administration. The state and local supervisors and the teachers who are rendering this valuable service to those who served the nation are to be commended for their untiring enthusiasm and co-operation. Their attitude toward the veterans' administration in developing the effectiveness of this comprehensive vocational education service is recognized and appreciated.

4. *Additional Federal Funds for Vocational Education.* The great interest in and demand for the expansion of programs in vocational education make it extremely necessary that the full amount of approximately $29,000,000 authorized by the George-Barden Act be appropriated for the coming fiscal year. The American Vocational Association urges the Congress of the United States, the Bureau of the Budget, and the U. S. Office of Education to exert every effort to reach this goal. Furthermore, the leadership of the American Vocational Association, as well as state and local administrators, are ready to supply any informational material needed in justifying this request.

5. *Federal and State Relationships in Administration and Service.* It is imperative that continued strong and effective co-operation exist between all types of administration of the vocational education program on the federal, state, and local levels. It is of paramount importance that the Executive Committee of the American Vocational Association continue to exert every effort toward this goal. Since so many leaders feel that there has been a decrease in the service rendered by the U. S. Office of Education, and that many leaders in, and friends of, vocational education are disturbed by this condition, the Executive Committee is urged to act as it deems necessary to improve the situation. The A.V.A. vigorously endorses the statement made in relation to the above mentioned condition at its second general session on December 16, 1947.

6. *Exemption of Teachers Retirement From Federal Income Tax.* Many of the retired teachers find themselves in a critical financial situation because of the fact that their retirement allowance is based on an extremely low previous salary schedule. Therefore, the Executive Committee is urged to support federal legislation which will exempt these former deserving teachers from federal income tax requirements. In making this request it is only asking the same consideration which is now shown to other similar groups enjoying social benefit legislation, such as Social Security and Old Age Insurance, Workmen's Compensation Benefits, War Veterans and Widows' Pension, Railroad Retirement Benefits, International Typographical Union Membership Benefits, and Unemployment Insurance — all of which are tax exempt.

7. *Commendations for Executive Committee.* The president, the vice-presidents, the executive secretary, and the treasurer are commended most highly for the efficient manner in which they have accepted and discharged their responsibilities in conducting the business of the American Vocational Association during the past year. The American Vocational Association is fortunate indeed, in having as its executive secretary a person who is serving the membership in a manner which has gained recognition for the A.V.A. making it possible for the Association to enjoy a ranking as one of the most important educational organizations in the United States. He is an educational statesman who has no equal. The Association and its 25,000 members pledge their wholehearted, enthusiastic support to him and the members of the staff. They stand ready at any time to follow his able leadership in the future promotion of vocational education.

8. *Universal Military Training.* If and when the Congress of the United States is of the opinion that the program of Universal Military Training is an absolute necessity, the American Vocational Association desires that its leaders have an opportunity to co-operate and assist in planning the program. There is sufficient evidence in the vocational education services rendered during the war production training program that the American Vocational Association is extremely interested in the security of the nation. Vocational educators are strongly in favor of appropriate measures to provide national security or preparedness but seem to feel that there are measures other than the proposed universal military training plan for accomplishing this result.

9. *State Associations.* The officers of the state vocational organizations are to be commended for their local leadership in developing strong and active state vocational associations, for it is through these active state vocational organizations that the national association derives its support and strength.

10. *Appreciation for Convention Arrangements.* The American Vocational Association is deeply indebted to many persons and groups for their various services rendered during the past year in planning for this convention. The American Vocational Association commends the state and local committees in Los Angeles, the state of California, Convention Bureau, and the city superintendent of schools and his staff for the excellent accommodations and entertainment provided during this series of meetings.

11. *Vocational Rehabilitation.* Since vocational rehabilitation is an important element in any comprehensive education service, it is recommended that such special service continue to be allied with education on a national level.

12. *Policies Committee.* It has been suggested that a national policies committee be appointed by the Executive Committee. It is recommended that this suggestion be referred to the A.V.A. Committee now studying reorganization and structure.

The new officers elected for the coming year are: president, Julian McPhee, state director of vocational education for the state of California, and president of the California State Polytechnic College at San Luis Obispo; vice-president for industrial-arts education, Frank Moore, director of industrial arts, Cleveland, Ohio, for another three-year term; vice-president for home economics, Miss Maude Williamson, head of home-economics education, Colorado A. & M. College, Fort Collins, Colo.; vice-president for business education, Donovan Armstrong, state supervisor of distributive education for the state of Louisiana; treasurer, Charles W. Sylvester, assistant superintendent of vocational education, Baltimore, Md.; executive secretary, Dr. L. H. Dennis.

Miss Florence Fallgatter, retiring president, will represent the field of vocational guidance.

Dr. G. Harold Silvius of Wayne University, Detroit, Mich., is the newly elected president of the National Association of Industrial Teacher Trainers.

E. J. Simon, state director of vocational education of the state of Illinois, was elected president of the National Association of State Directors of Vocational Education.

The full-day program held on Friday, December 19, at the University of California, Santa Barbara College, also was the occasion for the development of the Alpha Beta Chapter at Santa Barbara, and a Field Chapter at Los Angeles.

Epsilon Pi Tau also held an Industrial-Arts Fellowship Forum program at 4:00 p.m. Tuesday, and a Vocational Fellowship Forum on Thursday.

At the Santa Barbara banquet, Baldwin M. Wood, professor of engineering, and director of university extension, University of California, gave the main address on "Technology and Education." During the initiation ceremonies 61 members of

(Continued on page 14A)

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Delta* 20" Wood-cutting Band Saw

$325.00 without miter gage, motor, or switch

Takes any type of blade in any size up to 1 inch in width. Maximum height under upper guide is 13½"

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Delta 20" Band Saw features are among the newest and most advanced in the industry — many of them exclusive with Delta:

- To safeguard students, single-unit welded steel cabinet completely encloses all working parts. Doors provide quick access to wheels and motor.
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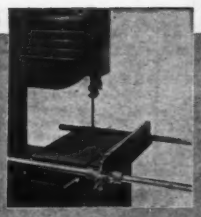
• *Free Bulletin! Gives specifications and detailed description of Delta 20" Wood-cutting Band Saw. There's a copy ready for mailing to you. Request it, by coupon below.*

20" x 24" table is rigidly supported on two widely-spaced trunnions. Conveniently tilts 45° to right; 12° to left.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(Continued from page 178)

Pi Sigma Chi were transferred to the Alpha Zeta Chapter of Epsilon Pi Tau. Thirty-four members of Pi Sigma Chi in the field were inducted into the newly organized Los Angeles field chapter of Epsilon Pi Tau.

E. E. Ericson and C. E. Nihart were named trustees of the two new chapters.

Dr. William E. Warner, executive secretary of Epsilon Pi Tau, acted as master of ceremonies.

At the Epsilon Pi Tau headquarters in the Biltmore Hotel, Los Angeles, the following student leaders from west coast chapter schools were entertained as guests:

Student members of Rho Chapter at San Jose State College, accompanied by Prof. Heber Sotzin, were Emil Anderson, San Francisco, Calif.; Billie Asher, Lindsay, Calif.; Jack Dimock, Lompoc, Calif.; Geo. Richmond, San Jose, Calif.; Robert Thom, Los Altos, Calif.; Ralph Wheeler, Oakland, Calif.; William White, Santa Clara, Calif.; and Geo. Wiens, San Jose, Calif.

From Kappa Chapter, Chico State College, Chico, Calif., came Robert Adams, Oakland, Calif.; Enrico Bongio, Shively, Calif.; Gerald M. Maddux, Chico, Calif.; Robert Ralston Troy, Nyz, Calif.; Max Samsel, Oakland, Calif.; and Robert Vogel and Calvin White, of Chico, Calif.

These men were accompanied by Professor Russell B. Kidder, director of the industrial-arts department; Lloyd B. Landis, assistant professor; and instructors Laverne Brandstatt and C. Bradley Page.

Sigma Chapter at Flagstaff, Ariz., was represented by Prof. H. O. Berg, and Morris Montgomery, Cottonwood, Ariz.; Paul Caldwell, Prescott, Ariz.; Robert Bencek, Cleveland, Ohio; and Edward Bergman.

Delta Chapter, Oregon State College, Corvallis, Ore., sent Lamont A. Klick, Sherwood, Ore.; Donald R. Wilson, Portland, Ore.; Lloyd Frazier, Portland, Ore.; and Frank Turner, Chilliwack, B. C., Canada. The students were accompanied by George B. Cox.

The Ship's program followed the House of Delegates meeting.

This always pleasing part of the convention entertainment program was in the able hands of Captain Bert Cholet, Higgins Ink Co., Inc., Brooklyn, N. Y.; First Mate John Backus, manager, Department of Education, American Type Founders Sales Corp., Elizabeth, N. J.; and Deck Officer H. Lew Webb, Carl F. Mahnke Productions, Vocational Guidance Films, Inc., Des Moines, Iowa.

The community singing, led by M. M. Hamlin, American Type Founders Corp., Elizabeth, N. J., and accompanied by H. Lew Webb, added materially to the prevalent good feeling.

The Ship's citation read by John Backus was impressive, and the choice of the men to be honored received the general acclaim of the audience.

The citations follow:

A Tribute
to Earl Leon Bedell

EARL LEON BEDELL, distinguished son of Michigan: In recognition of your outstanding Leadership in the field of Industrial Education, we of THE SHIP salute you. Your proven devotion to the great profession of teaching . . . your educational contributions as a Lecturer, Consultant, Teacher and Author of books and numerous magazine articles . . . your enduring faith in the fundamental educational philosophy of Learning Through Creative Effort . . . all these, combined with your readiness to serve our American youth, have enabled you to give to America that Educational Leadership that has made, and will continue to make, America the Land of Opportunity. • Earl Leon Bedell, Director of Technical Schools, Detroit, Michigan, and Professor of Vocational Education, Wayne University . . . your life dedicated to the interests of American Democracy in Peace and War . . . your clear vision and sterling personality have enabled you to serve and guide our youth in the ideals of Democracy, that America may continue to be a nation of Free Men. • Earl Leon Bedell, we of THE SHIP are honored by this privilege to pay tribute to you and your constructive leadership in American Education. Again . . . we salute you . . . as we wish you many more years in which to guide American Industrial Education to even greater heights of achievement.

Given under our hand and seal this eighteenth day of December, One thousand, nine hundred and forty-seven, A. D., during the Forty-first Annual Convention of the American Vocational Association, held in the City of Los Angeles, State of California.

The Ship — Bert Cholet, John Backus, H. Lew Webb, Carl F. Mahnke

Ship's Committee on Recognition of Valiant Service — Charles A. Allyn, Fred J. Brown, Harry C. Morton, Earl M. Bradley

A Tribute
to Howard Arthur Campion

HOWARD ARTHUR CAMPION, eminent son of Minnesota and California: We of THE SHIP salute you. Your unselfish and enthusiastic devotion to the noble profession of Education which has characterized your life . . . your educational contributions as a Lecturer, Consultant, Teacher and Author are worthy achievements in a life consecrated to the advancement of human relations through Education . . . your broad vision and unreserved faith in our American Way of Life in which Education and Industry are inseparable . . . all these, combined with that fine though rugged personality so characteristic of your native State of Minnesota, have enabled you to give to our nation an Educational Leadership that will guide our youth in the ideals of American Democracy. • Doctor Howard Arthur Campion, Assistant Superintendent of Schools, City of Los Angeles, California: In the true American spirit you have served well your City, your State and your Country and in so doing you have inspired others to higher goals of endeavor. • We of THE SHIP are honored by this privilege to pay tribute to you and your constructive Leadership. Again . . . we salute you . . . as we wish you many more years in which to guide American Industrial Education to even greater heights of achievement.

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(Continued on page 16A)

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L-4 LOCKER TYPE...

Here is the specially constructed locker type woodworking bench available now for immediate delivery. This popular bench has a large flat all-maple durable top with a vise at each corner, thus providing four separate work stations for individual projects.

We have a supply of these outstanding benches in answer to the many requests that have come to us during the past year. When writing—specify L-4 locker type.

FEATURES...

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(Continued from page 14A)

♦ The second district of the Indiana Industrial Education Association met in South Bend, in the Oliver Junior High School on Saturday, December 13, 1947. Industrial arts and art teachers from Bourbon, Elkhart, Goshen, LaPorte, Michigan City, Mishawaka, Nappanee, Plymouth, South Bend, Tyner, Walkerton, Warsaw, and Westville, attended.

The morning meeting was held in the general shop where more than a dozen South Bend shop teachers demonstrated the use of plastics to show its desirability and practicality for use in schools. L. W. Yoho, industrial-arts teacher, was in charge of the demonstration. The following processes were demonstrated: laying out, sawing, filing; buffing; hand forming; cementing and dyeing; bonding; forming by use of jigs and fixtures; machining on the lathe; molding liquid plastics; carving internally; embedding; laminating, etc. Some of the visiting teachers became so enthused that they too started to build a project for themselves. The demonstration was in progress from 9:30 till 11:45.

The injection method of using plastics was demonstrated on a small injection press by C. A. Needler.

A large and varied exhibit of plastic projects made in the Adams High School, Jefferson Jr. High, Linden Jr. High, and Oliver Jr. High Schools, were shown. Textbooks on plastics and catalogs indicating sources of supply were also on display.

♦ The Twentieth Annual Convention of the Michigan Industrial Education Society will be held in Grand Rapids, April 8, 9, and 10, 1948. Convention headquarters will be the Pantlind Hotel.

Dr. Frank Moore, director of industrial education, Cleveland, Ohio, will be the speaker at the banquet in the Pantlind Ballroom on Friday evening, April 9. The Ship's luncheon will be held on Saturday. The speaker at the Ship's luncheon will be Colonel Karl Detzer, Roving Editor, *Reader's Digest*.

Exhibits of wood and metalworking machinery, shop equipment and supplies, textbooks and visual aids, projects and teaching devices will be on display in the civic auditorium. Demonstrations of machine operations and work with plastics will be carried on by experts throughout the day on Friday.

♦ The Missouri Annual Spring Conference on Industrial Education, which is sponsored jointly by the State Department of Education and the College of Education of the University of Missouri, will be held in Columbia, Mo., on Friday and Saturday, May 7 and 8, 1948.

♦ The annual meeting of the Indiana Industrial Education Association, District 4, was held at Purdue University in the education building on Saturday morning, February 8, 1948. The meeting got under way about 10:00 a.m., under the chairmanship of B. R. Blunk. An interesting field trip through the shops then followed.

After the luncheon, talks were given by L. D. Waid, principal of the school; J. R. Shafer, president of the Indiana Industrial Education Association; and F. J. Croop, chairman of District No. 2. A clinic on plastics followed in which many questions were answered concerning the use of plastics in schools.

♦ The Indiana Industrial Education Association convention will be held at Turkey Run State Park, Ind., April 15, 16, and 17. The program committee has plans well under way for a good program. Make reservations early.

♦ The Ohio Industrial Arts Association will hold its annual conference in Columbus, Ohio, April 16 and 17.

There will be an afternoon and dinner program on Friday, and a morning and luncheon program on Saturday.

A display of industrial-arts work from county and village schools will be a special feature of the convention.

Dr. John A. Whitesel, professor of industrial arts education, Miami University, is president of the association.

♦ The Kansas Vocational Association has elected the following officers for the ensuing year: president, Nelle West, co-ordinator, part-time office training, Wichita, Kans.; vice-presidents, Irene Eisenhower, home economics, Solomon; S. S. Bergsma, agriculture, Ottawa; W. B. Skelton, part-time retailing, Wichita; W. F. Currier, director, McFarland Trade School and vocational education, Coffeyville; secretary-treasurer, F. E. Carpenter, agriculture, Topeka.

News Notes

♦ A class meeting at which the students were seated in a lecture room at the City College School of Business and Civic Administration, 17 Lexington Ave., New York, N. Y., and the instructor spoke from Columbus, Ohio, was held Thursday, February 26, at 12:30 p.m.

The meeting demonstrated how communication techniques, used heretofore by the army and navy and large corporations to enable executives to talk from their offices to several hundred persons at once, can be applied to schools and colleges. Equipment for the test was installed by the Jordanoff Corporation and transmission was made over a telephone hookup. It was the first time such equipment had been used by any college.

♦ Vocational counselors, students, teachers, and veterans will find information on careers in meteorology in a new occupational abstract, *Meteorologist*, by Margaret Dunbar and Mary Brilla. This pamphlet is now available from the publisher, Occupational Index, Inc., New York

(Continued on page 19A)

WILLIAM BRYANT — Master Saw Maker with Experience

For thirty-three years, since 1915, "Billy" Bryant has been making saws at our Lawrenceburg plant. He's become an expert saw filer of hand and carpenter saws and is proud of every saw that passes through his hands.

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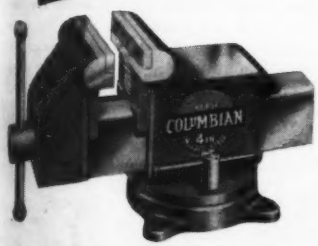
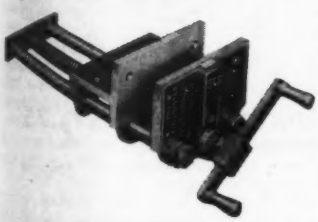


The Columbian 804 Work Shop Vise is a rugged all-purpose vise of steel construction — fabricated by arc welding. Front and back jaws are welded from heavy steel. Screw and handle are cold rolled steel. Each Columbian 804 is finished in red enamel and packed in individual cartons.

Columbian Workshop Vise



★ Columbian Continuous Screw Woodworker's Vises are furnished with hard wood handles — or may be equipped with ADJUSTABLE STEEL HANDLES as above, to eliminate handle breakage, speed operation and provide extra leverage.

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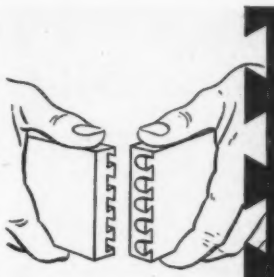

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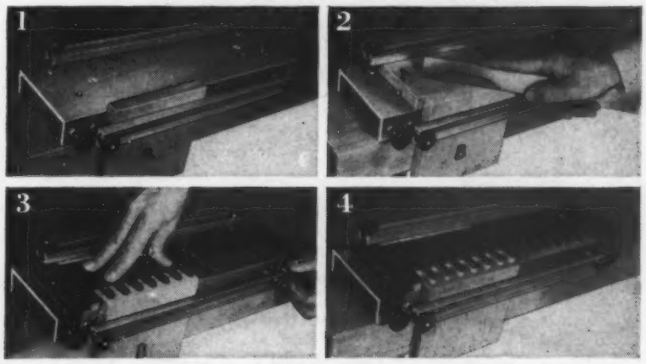

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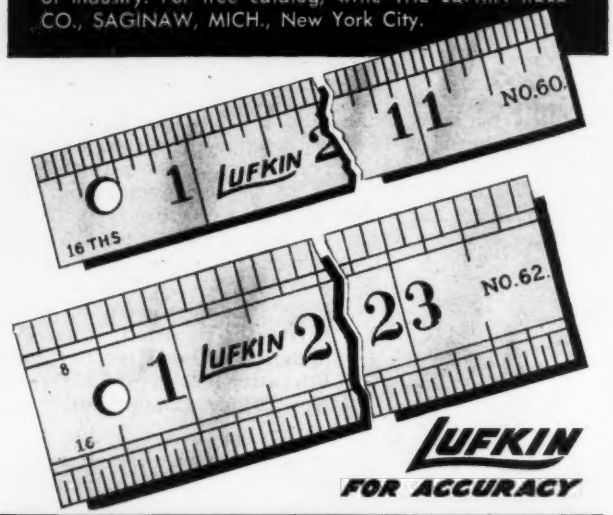

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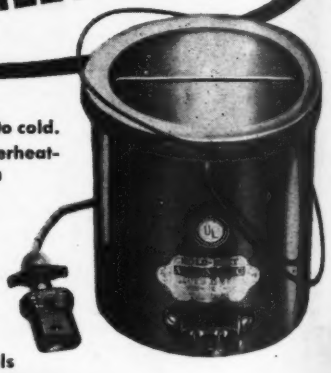

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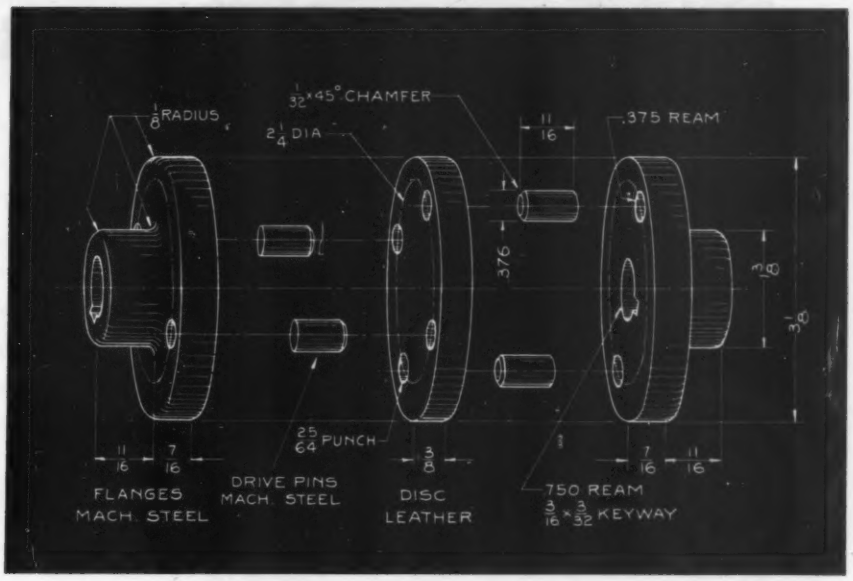

Write to the address below, if you are not already receiving these free problems. We'll gladly place your name on our mailing list.

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(Continued from page 16A)

University, New York 3, N. Y., for 50 cents, cash with order.

♦ Work began recently to evaluate methods and instruments used to test the vision of school children who may need eye care, in a study sponsored jointly by the National Society for the Prevention of Blindness, 1790 Broadway, New York 19, N. Y., the U. S. Children's Bureau of the Federal Security Agency, and the Missouri Division of Public Health.

Co-operating in this study, in addition to the Washington University School of Medicine, is the St. Louis City Board of Education.

♦ Four groups of college engineering students have been admitted to American Foundrymen's Association, international technical society of the castings industry, as student chapters.

International directors of the 10,000-member AFA have approved the formation of local units at the University of Minnesota, the school of mines and metallurgy of the University of Missouri, Ohio State University, and Massachusetts Institute of Technology.

Student members will participate in AFA-sponsored college-industry co-operative activities, particularly those of the society's educational division —one of its eight specific interest sections— which furthers the training of engineers and technologists for the castings field. Through AFA advisers students will obtain information on career opportunities in the industry and gain practical experience in castings plants during vacations.

♦ General Motors Institute, Chevrolet and Third Aves., Flint, Mich., announces the continuation of its auto mechanics teacher training program in two sections for the summer of 1948. The courses, for college and high school instructors of auto mechanics and service subjects, will run from June 21 to July 17 and from July 19 to August 14.

The program was first presented in 1933, as the result of requests from teachers for information on passenger car and truck specifications and adjustments. It was resumed in 1946 after a four-year wartime lapse.

Application for enrollment may be obtained by writing to the Registrar, General Motors Institute, Flint, Mich.

♦ A refresher course in textiles and testing techniques will be conducted again this year at the main laboratories of the United States Testing Company, Inc., 1415 Park Ave., Hoboken, N. J. Classes will be in session from 9:00 a.m. to 4:00 p.m., Monday through Friday, for a three-week period, July 12 through July 30.

The work comprising physical testing, microscopy, chemistry, bacteriology, and engineering, will be represented in the three weeks' study. Through lectures, demonstrations, and practice sessions, students will cover all phases of testing for textiles and related merchandise. Specific instructions in the origin, identification, and composition of natural and man-made fibers, the testing of woven and knitted fabrics for serviceability and durability will be included. Special emphasis will be given to the various processes of textile finishing and dyeing. Sample swatches of fabrics, yarns, and fibers, mimeographed text and other illustrative material will be distributed. Field trips to industrial plants, including a textile finishing mill and the manufacturer of synthetic fibers, will be conducted for those interested.

♦ Qualified teachers of silversmithing and jewelrymaking in universities, teachers colleges, and art schools throughout the United States are invited to apply for fellowships at the second annual silversmithing workshop conference for teachers, sponsored by Handy and Harman, refiners and dealers in precious metal. The conference will be held from August 2 to 27, at the Rhode Island School of Design in Providence. The attendance is limited to 12 carefully selected teachers.

Application forms and requirements are available by writing the Craft Service Department, Handy and Harman, 82 Fulton St., New York 7, N. Y.

♦ A group of apprentice instructors from the Gary Steel Mills, Gary, Ind., under the direction of Supervisor Dale Atkins, is meeting in a teacher training program with Professor Swope to reorganize and extend the instruction material now used in the mills.

Questions and Answers

TOOLS AND THE TOOLROOM

1124. Q.: Could you refer us to articles illustrating toolrooms or methods of housing tools for school shops? —*F. E. D.*

A.: The following two articles in former issues of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION may help you solve your problem: "Tool Storage: A Place for Everything and Everything in its Place," by G. H. Silvius and H. J. Johnson, pp. 274–278, September, 1944; and "The Tool-Crib Problem," by H. A. Allender, pp. 346 and 347, October, 1947. —*J. J. M.*

INDUSTRIAL ARTS AWARDS FAIR

1125. Q.: Where can information be obtained relative to the 1948 Industrial Arts Awards Fair? —*H. M. G.*

A.: Write to George H. Fern, director of the Industrial Arts Awards, 220 E. 42nd St., New York 17, N. Y. —*J. J. M.*

Sensible guys are goggle-wise
They keep them on and save their eyes.
— *National Safety Council.*

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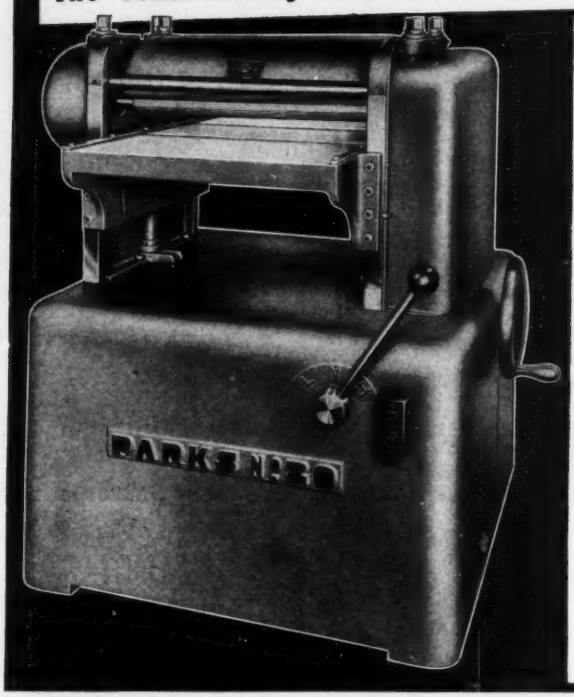

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New Publications

Practical Sign Painting

By Robert E. Owen. Cloth, 143 pp., 6⅛ by 9⅜ in., illus., $3. The Bruce Publishing Company, 540 North Milwaukee Street, Milwaukee 1, Wis.

A textbook on sign painting which will help the apprentice and learner prepare himself for his trade, and will be a ready reference book for the journeyman sign painter.

The chapters present the reader with helpful suggestions on the selection and care of equipment and material, directions on how signs are produced, an interesting résumé on various sign alphabets, how brush lettering is done, methods to be used for composition and layout of signs, how color harmony is obtained, how the background is prepared, and how signs of various kinds are erected and safely fastened in place.

Using and Managing Soils

By A. F. Gustafson. Cloth, 420 pp., 6⅛ by 9¼ in., illus., $2.80. The McGraw-Hill Book Co., New York, N. Y.

A book for farmers and students of farming who want to learn how to select good farm land, drain, and improve it so it may produce efficiently.

Tilling and managing crop soils; controlling the water in the soil; soil erosion; managing acid and alkali soils; keeping up organic matter and nitrogen in soils; using green and farm manures, and commercial fertilizers properly; planning crop rotation; managing pasture, garden, fruit, and lawn soils; and keeping soils productive over the years.

What to Make for Children

Cloth, 112 pp., 6⅝ by 9½ in., illus., $2. Popular Mechanics Co., 200 East Ontario St., Chicago 11, Ill.

This book presents a very fine collection of plans and descriptions of how to make toys, pieces of furniture, and other things that will delight the children. More than that, this book will delight the father or older brother who likes to work in his home workshop.

Job Evaluation

By Jay L. Otis and Richard H. Leukart. Cloth, 471 pp., 6¼ by 9¼ in., $6.65. Prentice-Hall, Inc., New York, N. Y.

In this book job evaluation has been made the basis of wage and salary determination. The 16 chapters present the basic problems of wage and salary administration; the various job evaluating systems (quantitative and nonquantitative); planning the evaluation program; getting job facts, specifications, and descriptions; job rating scales; verification of the ratings; classifying the employees; the wage curve; job evaluation and collective bargaining; and wage and salary administration as a management control.

The appendix presents quite an extensive bibliography; also a series of questions on job evaluation.

Outdoors With the Camera

By Paul Grabbe and Joseph E. Sherman. Cloth, 120 pp., 7⅜ by 8⅝ in., illus., $3. Harper & Brothers, New York, N. Y.

A revision of a fine book which tells the beginner in simple words how to improve his picture making technique. It is well illustrated and shows what to do, and what not to do in selecting a camera, choosing the view, making the right exposure, and developing the film.

Safety for the Household

Paper cover, 190 pp., 5⅞ by 9⅛ in., illus., 75 cents. Superintendent of Documents, Washington 25, D. C.

This excellent treatment on safety ought to have a wide circulation. The common dangers about the home are divided, for purposes of discussion, into the following divisions: chemical hazards, electrical hazards, fire hazards, gas hazards, lightning, mechanical hazards, miscellaneous hazards, yards and gardens, suggestions for building a home, and first aid.

The book contains 12 tables which give statistical data on accidental injuries.

1947 Most-Often-Needed F.M. and Television Servicing Information

By M. N. Beitman. Paper, 192 pp., 8⅜ by 10⅞ in., illus., $2. Supreme Publications, Chicago 12, Ill.

This is a compilation of factory instructions on adjustment and repair of popular radio and television sets. The book contains much helpful information for repairmen who have to service these instruments.

A Manual on Pottery Craft

By J. A. F. Divine and G. Blachford. Cloth, 85 pp., 5⅝ by 8¾ in., illus. Frederick Warne & Co., Ltd., New York, N. Y.

An interesting and instructive book for the student and hobbyist who wants to know something about how to practice this ancient art.

The book starts out with the preparation of the clay, shows how modeling is done, how pottery can be fashioned by the coil and pressed method, and by throwing, turning, and casting.

The method of finishing and decoration also is explained. The organization of a class, layout of the shop, and the equipment and materials needed are also treated in the book.

Essentials of Cashiering

By Brice Cecil. Paper cover, 106 pp., 6 by 9 in., illus., $1.60. Prentice-Hall, Inc., New York, N. Y.

The author of this book knows how to teach students of distributive education, and this book shows other teachers just how he does it.

The subject of cashiering is explained in simple understandable terms and the appendix, besides giving tips to cashiers, and tests for students of cashiering, presents a good job breakdown and a helpful bibliography.

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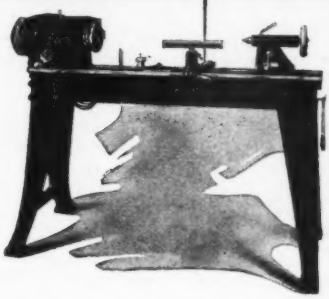
No. 159 Motor Driven

SPEED LATHE



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Write for Bulletin No. 159

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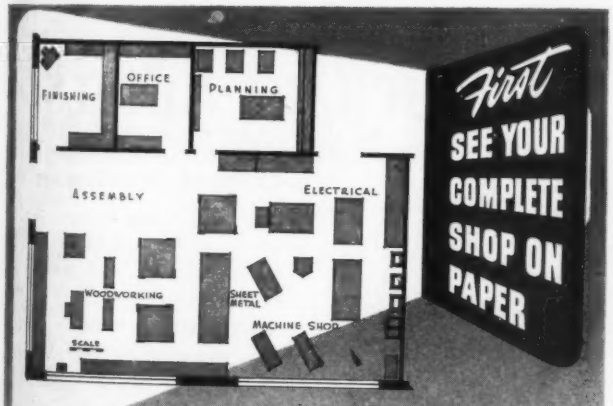

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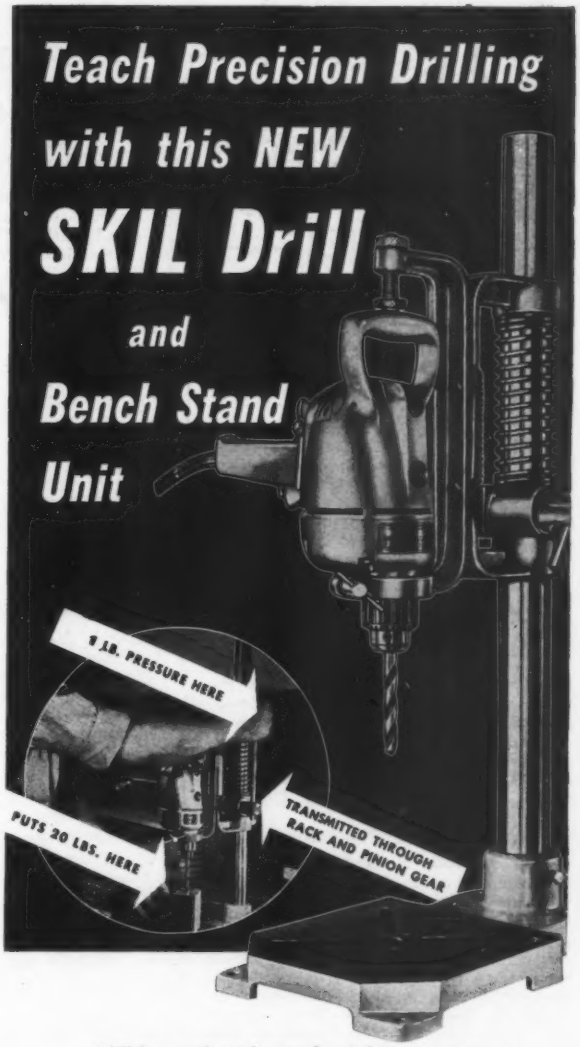
Teach Precision Drilling with this NEW SKIL Drill and Bench Stand Unit



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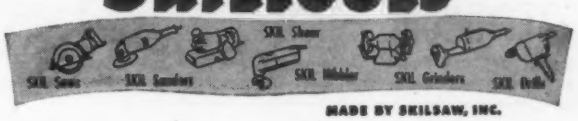

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Shop Equipment News

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New Stanley pull push rule

vertical as horizontal measurements. Accurate readings on overhead measurements are assured. Blade can be completely removed from case for taking end to end measurements. Extra width of blade (⅝ in.) provides greater rigidity for long measurements. Concave surfaces of nickel plated case assure solid two finger grip while blade is extended.

For brief reference use IAVE—0401.

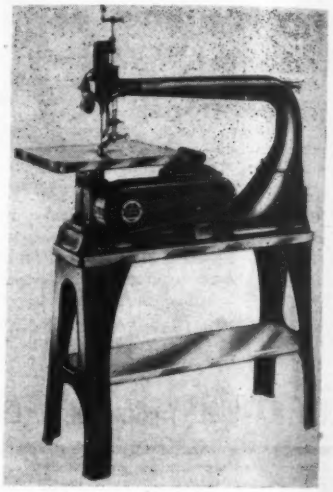
NEW JIG SAW AND TABLE SAW

Two new power tools have been placed on the market recently by Walker-Turner Co. Inc., Plainfield, N. J.

The new jig saw has a 24-in. throat capacity, four speeds, and a new tension adjuster, blower, and saw guide. The new drive mechanism insures vibrationless operation.

The machine has a 16 by 12¾-in. table which may be tilted to 45 deg. It may be had with or without bench.

(Continued on page 26A)



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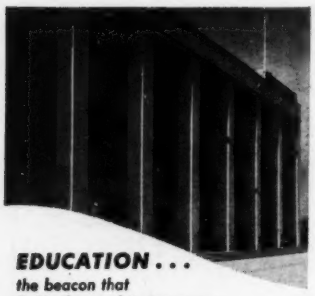

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Division of Vocational and Practical Arts Education

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June 28—August 6

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An elementary metalworking text planned to meet all the requirements of the modern school shop. Unit treatments of typical shopwork including an extensive discussion of art metalwork, illustrated with drawings and photographs of the finished pieces. Without equal in coverage of equipment, the study of abrasives, drills, and tools. Well organized, printed in clear, modern type and on a page size easy to handle. 170 photographs, 133 drawings. $2.96

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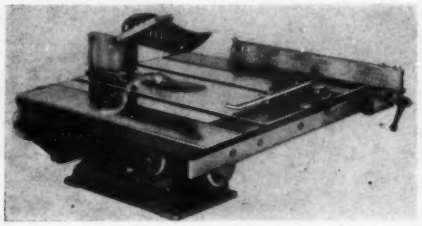
Originators and Pioneer Manufacturers of Oilstone Tool Grinders

(Continued from page 22A)

The 24-in. arm may be swung to either side or removed entirely. It requires a 1/3-h.p. motor.

The new table saw has a base of welded steel, and the table itself is of cast iron. Hand cranks, conveniently located, will raise, lower, or tilt the table.



New Walker Turner table saw

A ½-h.p. motor is required when an 8-in. saw is used, and a 1-h.p. motor when a 9-in. blade is used.

The 20¼ by 15-in. table is made of gray iron and the maximum depth of cut for the 8-in. blade is 2½ in., and for the 9-in. blade, 3 in.

For brief reference use IAVE—0402.

SOCKET WRENCH RATCHETING ATTACHMENT

Any ½-in. drive socket wrench handle or attachment can be converted into a ratcheting device with the new Ratchetor, announced by the Plomb Tool Company, Los Angeles 54, Calif. The tool, designated as No. 5447, has a ½-in. square plug with ball check for holding a socket wrench, a ½-in. square opening for insertion of a handle or attachment, and a reversible ratcheting mechanism.

The Ratchetor is intended mainly for use with a hinge handle, a hinge handle plus extension, a

Ratcheting attachment for socket wrenches

speed handle, or a torque wrench, but it can be used with other nonratcheting handles.

It is a positive-acting device, sturdily built for high torque strength — yet compact for ample clearance. A ball-type thrust bearing and light spring tension result in very little back drag. The 34 ratchet teeth provide positive engagement

(Continued on page 28A)

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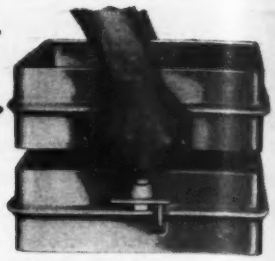

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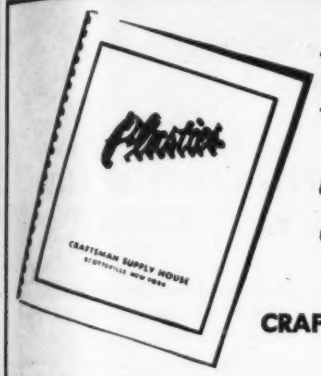

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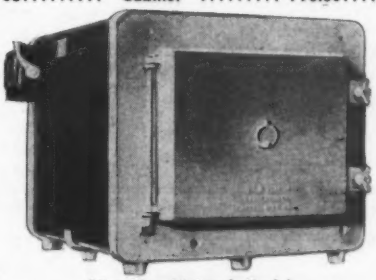

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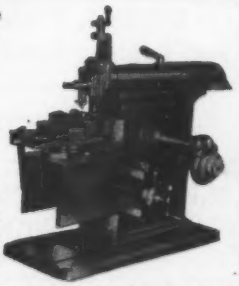

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(Continued from page 26A)

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For brief reference use IAVE—0403.

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The Chicago office will enable the Frank Paxton Lumber Company to serve areas heretofore out of its reach due to unfavorable freight rates. Like all the other yards, the Chicago yard will be able to provide soft and hardwoods, plywoods, and similar material to the instructors of industrial arts and vocational education shops.

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